Elettaria Cardamomum and Vitamin B-3: Novel Considerations in Therapeutics

M. Asif Shahab¹, Mohsin Ali Hassni², M. Iqbal³, Sana Dur Muhammad¹, Shehroz Bashir¹, Shah Murad⁴*, Seema Shah Murad⁵, Abdul Qudoos¹

¹Assistant Professor of Forensic Medicine at HITEC-IMS, Taxilla Pakistan
²Research Scholar at Molecular Biology/Biotechnology, CASVAB, UOB, Quetta, Pakistan
³Associate Professor of Microbiology at QIMS/CMH, Quetta Pakistan
⁴Research Scholar at SMC/JSMU, Karachi Pakistan
⁵Emergency Medicine Resident at Hamad Medical Corporation, Doha, Qatar
⁶Professor of Pharmacology at QIMS/CMH, Quetta Pakistan
⁷Research Associate at HSA/NIH, Islamabad, Pakistan
⁸Professor of Pharmacology at HBSMDC, Islamabad Pakistan

*Corresponding Author: Shah Murad
Professor of Pharmacology at QIMS/CMH, Quetta Pakistan

Abstract: An important motive for preventive paediatric cardiology is the fact that vascular atherosclerotic lesions may develop in early life. A high risk strategy has been advocated to identify children with hypercholesterolaemia both in the United States (US National Cholesterol Education Program for Children and Adolescents, NCEP-Peds) and European countries including Sweden. The major indicators for lipoprotein screening are a family history of premature CAD and/or a parental serum cholesterol concentration 6.20 mmol/l or greater. A major problem is that the parents are usually quite young and that many children live in one parent households. With coronary artery disease, plaque first grows within the walls of the coronary arteries until the blood flow to the heart’s muscle is limited. View an illustration of coronary arteries. This is also called ischemia. It may be chronic, narrowing of the coronary artery over time and limiting of the blood supply to part of the muscle. Or it can be acute, resulting from a sudden rupture of a plaque and formation of a thrombus or blood clot. The traditional risk factors for coronary artery disease are high LDL cholesterol, low HDL cholesterol, high blood pressure, family history, diabetes, smoking, being post-menopausal for women and being older than 45 for men, according to Fisher. Obesity may also be a risk factor. In this work we compared hypolipidemic effects of Niacin with Cardamom. Seventy five hyperlipidemic patients were selected for research work. They were divided in three groups. Group-I was on placebo, group-II was given 1.5 grams Niacin, and group-III was advised to use powdered Cardamom thrice daily for the period of two months. Their lipid profile was measured at start of research and then on day-60. After two months therapy group-II reduced total cholesterol 30.8 mg/dl and LDL cholesterol 12.1 mg/dl and increased HDL cholesterol 5.6 mg/dl. In group-III Cardamom decreased total cholesterol 7.2 mg/dl and LDL cholesterol 8.8 mg/dl. HDL cholesterol in this group increased 4.9 mg/dl. When results were compiled and analyzed biostatistically, these changes were significant. We conclude from the research work that Niacin has more effects on total cholesterol but effects of both drugs on LDL cholesterol reduction was almost same. KW: serum fats, heart, oxidative stress, heart, prevention, niacin, green illaichi.

Keywords: Paediatric, Cholesterol, Vitamin, Heart, Children.

INTRODUCTION

Serum lipoproteins are related to vascular atherosclerotic changes early in life and the extent of the lesions is dependent on serum lipoprotein concentrations determined before the fatal event. If prevention of premature atherosclerosis should start as early as possible, a high risk strategy may be justified to identify children with hereditary lipid disorders...
and those with several coronary artery disease (CAD) risk factors. During childhood and adolescence a low fat diet, optimal physical activity, and the avoidance of smoking may reduce the CAD risk. We have developed a family therapeutic method that effectively promotes lifestyle changes required to prevent severe obesity. Therefore we have a potentially safe and effective method of changing dietary habits and physical activity in children with a high risk of CAD, so the key issue was to identify children at greatest risk. A family history of heart disease is an important determinant of CAD risk with implications not only for the patient but also for other family members. Hypolipidemic drugs reduce low density lipoprotein cholesterol (LDL-c) in plasma and thus lower the chance of developing atherogenesis leading to increased risk for hypercholesterolemic patients to be victimized by coronary artery disease, and myocardial infarction [8]. Conventionally hypolipidemic drugs used are Statins, Nicotinic acid, Bile Acid Binding Resins and Fibrates, but all have characteristic of potential for low drug-patient compliance due to wide range of pharmacological and adverse effects [9]. Vitamin B-3 (Niacin), if given in large doses inhibits lipolysis in adipose tissue which is main source of plasma free fatty acids. In liver due to lack of these free fatty acids, no triglycerides or lipoproteins carrying these lipid forms (VLDL) will be synthesized. Low density lipoproteins (LDL) are synthesized from VLDL. Thus no availability of very low density lipoproteins (VLDL) causes reduced synthesis of LDL in plasma. Niacin also decreases clearance of apoprotein A-1 in plasma, so High Density Lipoproteins (HDL) which are linked with existence of these apoproteins are also increased [10, 11]. To get good drug-patient compliance many health related modern researchers have started to put their haeling potential for developing alternatives drugs used in primary or secondary Hyperlipidemia. Cardamom or in urdu ILAICHI is one of the hypolipidemic herb, widely encouraged by cardiologists to be used for prevention of atherogenesis, and coronary artery disease [12]. Cardamom contains some Phenolic compounds and Flavonoids which act as free radical scavengers [13]. Green Ilaiichi contains some chemical compounds which act as antioxidant at myocardial cells and hepatocytes. This medicinal herb also have characteristic to contain glutathione which acts as protection of normal visceral cells from damage due to formation of free radicals in various metabolic processes in human body [14]. Oral administration of cardamom extract significantly reduced total cholesterol, high-density lipoprotein (HDL), low-density lipoprotein, and very low density lipoprotein and triglycerides in hyperlipidemic patients [15].

**Patients & Method**

It was single blind placebo-controlled study conducted in Jinnah Hospital Lahore from July to November 2023. Seventy five hyperlipidemic patients were selected and enrolled for the study. Written, already explained and approved consent was taken from all patients. Inclusion criteria was age limit from 18 to 70 years of both gender primary or secondary hyperlipidemic patients. Patients suffering from any vital organ severe disease or their impaired function were excluded from the study. Alcoholics, cigarette smokers and patients taking regular medicine for their any physical or mental disease were also excluded. Seventy five patients were divided in three groups, comprising 25 patients in each group. Group-I were on placebo therapy. They were provided capsules containing grinded rice and mixed wheat. They were advised to take one capsule before meal, thrice daily for two months. Group-II patients were advised to take half Tablet Niacin 250 mg, thrice daily after each meal. They were advised to raise dose of Niacin to two tablets of 250 mg, thrice daily after each meal for the period of two months. Their base line lipid profile was determined by Freidewald Method. Total-cholesterol, LDL-cholesterol and HDL-cholesterol were main parameters we required for further calculation of change in these parameters. All patients were advised to visit clinic fortnightly for their follow up. After two months therapy their lipid profile was measured again by same Freidewald Method. Data were expressed as the mean ± Standard Deviation and “t” test was applied to determine statistical significance as the difference. A probability value of <0.05 was considered as non-significant and P<0.001 was considered as highly significant change in the results when pre and post-treatment values were compared.

**Results**

After two months therapy Mean values were expressed in SD ±SEM and paired t-test was applied to analyze results biostatistically. Following changes were observed in Total, LDL, and HDL cholesterol with expression of their statistical significance.

<table>
<thead>
<tr>
<th>GROUP</th>
<th>Parameter</th>
<th>At day-0</th>
<th>At day-60</th>
<th>Change</th>
<th>% change</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>G-I n=25</td>
<td>TC</td>
<td>228.4±1.99</td>
<td>226.4±1.23</td>
<td>1.8</td>
<td>0.8</td>
<td>&gt;0.05</td>
</tr>
<tr>
<td></td>
<td>LDL-C</td>
<td>178.4±1.67</td>
<td>176.5±1.09</td>
<td>1.9</td>
<td>1.1</td>
<td>&gt;0.05</td>
</tr>
<tr>
<td></td>
<td>HDL-C</td>
<td>40.7±1.90</td>
<td>40.9±2.98</td>
<td>0.2</td>
<td>0.5</td>
<td>&gt;0.05</td>
</tr>
<tr>
<td>G-II n=22</td>
<td>TC</td>
<td>235.4±1.11</td>
<td>204.6±1.99</td>
<td>30.8</td>
<td>13.1</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>LDL-C</td>
<td>181.1±2.87</td>
<td>169.0±2.22</td>
<td>12.1</td>
<td>6.7</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td></td>
<td>HDL-C</td>
<td>43.5±1.99</td>
<td>49.1±1.04</td>
<td>5.6</td>
<td>11.4</td>
<td>&lt;0.01</td>
</tr>
</tbody>
</table>
DISCUSSION

Cholesterol is found in every cell of the body and has important natural functions when it comes to digesting foods, producing hormones, and generating vitamin D. It is manufactured by the body but can also be taken in from food. It is waxy and fat-like in appearance. There are two types of cholesterol: LDL (low-density lipoproteins, bad cholesterol) and HDL (high-density lipoproteins, good cholesterol). Niacin is major drug to treat primary or secondary Hyperlipidemia. In our results two months therapy with Niacin decreased total and LDL cholesterol 13.1 and 6.7% respectively. Statistically decrease in total cholesterol is highly significant while change in LDL-cholesterol is significant biostatistically. These results match with results of study conducted by Cantarella L et al., [16], who observed about same changes in lipid profile of 107 patients. Our results of change in HDL cholesterol also match with results of Capuzzi DM et al., [17], who observed 14% increase in HDL cholesterol of 55 hyperlipidemic patients. Mittal MK et al., [18], explained that hypolipidemic effects of Vitamin B-3 (Niacin) can be achieved in doses that can damage liver. Soga T et al., [19], conducted research and proved that one gram of Niacin per day lowered total cholesterol maximum up to 9.11 mg/dl and LDL cholesterol up to 6.90%. These results are in contrast with our results. This difference in two results can be due to low dose of the drug used in their research work. Bruckert eric et al., [20], has warned researchers that vulnerability of hepatic damage can not be avoidable in hypolipidemic doses of this vitamin B-3 (Niacin). To avoid frequent adverse effects and economic cost of conventional hypolipidemic agents like Niacin or Fibrates or even Statins, alternative hypolipidemic therapy by herbal medications are going to get popularity in different ethnic groups in developing countries. Green Cardamom is used generally in many cocktail food preparations in India, Pakistan, Bangladesh and Sri Lanka [21]. Our research study proved significant changes in total and LDL cholesterol in 24 hyperlipidemic patients, i.e. 7.2 mg/dl reduction in total cholesterol and 8.8 mg/dl decrease in LDL cholesterol. Changes in both parameters are biostatistically significant. Almost same results were observed by Babu PV et al., [22], in LDL-cholesterol, but they proved lesser reduction in total cholesterol, i.e. only 1.9% decrease in total cholesterol in four hyperlipidemic patients when they used one gram of green cardamom for three months. This difference may be due to small sample size, though they used same amount of cardamom as we used in our study. Goto T et al., [23], proved same increase in HDL cholesterol as we observed in our work. Galleano M et al., [24], agree with Alam K et al., [25], who wrote that wide variety of pharmacological effects by green Cardamom may cause metabolic processes of human body to affect carbohydrates, proteins and lipid metabolism beneficially but negligible adverse effects are not being evaluated which needs meta-analysis and research on these herbs. High cholesterol is a significant risk factor for coronary heart disease and a cause of heart attacks. A build-up of cholesterol is part of the process that narrows arteries, called atherosclerosis, in which plaques form and cause restriction of blood flow. Reducing intake of fat in the diet helps manage cholesterol levels [26-30]. Many other scientist/researchers proved same increase in HDL cholesterol as we observed in our work.

REFERENCES


