Hyperuricemia and Blood Lipid Levels in Chronic Myelogenous Leukemia

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ABSTRACT

Number of epidemiologic studies has been published in recent year showing an increased risk of death in cancer with lipid abnormality. In the present study, chronic myelogenous leukemia (CML) patients (age 69 ± 7.23 years) with hyperuricemia and healthy controls (age 67 ± 6.93 years) in Sir J.J. Group of Govt. Hospitals, Mumbai displayed significant (p<0.05) difference in serum cholesterol, HDL and LDL cholesterol and triglycerides levels. The results of the study suggest cost effective, usefulness of these blood lipids in patients with CML for undiagnosed stages of cancer.

Key words:
Blood lipids, Chronic myelogenous leukemia

MATERIALS AND METHODS

Present study was carried out in the Department of Biochemistry, Grant Medical College and Sir J.J. Group of Govt. Hospitals, Mumbai. Thirty five patients with CML with age 69 ± 7.23 years and 30 healthy controls with age 67 ± 6.93 years were included. The patients with cardiac disease, hepatic disease, diabetes mellitus, liver disease, and Human Immunodeficiency Virus (HIV) infection were excluded from the study. The details such as history, treatment, report of routine investigations reports were recorded with the help of oncologist.

After 12 hours overnight fasting venous blood samples were collected in test tube with aseptic precautions. After two hours of collections samples were centrifuged at 3000 rpm for 5 minutes. Serum was separated and collected in polythene tube with cork. The sera with no sign of hemolysis used for the analysis of uric acid, total cholesterol, triglycerides, high density lipoprotein (HDL) cholesterol and low density lipoprotein (LDL) cholesterol.

Serum uric acid was estimated using kits from Biolab diagnostic’s based on the method of Uricase - PAP method 3. Total cholesterol (TC), triglycerides (TG), and high density lipoprotein (HDL) cholesterol were analyzed by commercial kits 7, 2, 12. All the estimations were carried out on a fully automated analyzer Olympus AU-400. Serum low density lipoprotein (LDL) cholesterol level was estimated by calculation using Friedewald et al. (1972) formula 6.

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LDL \text{ cholesterol} = \text{Total cholesterol} - \frac{\text{TG}}{5} - \text{HDL}
\]

Statistical analysis:

Numerical variables were reported in terms of mean and standard deviation. Statistical analysis of results was done by Z test. In this analysis, variables showing p value ...
RESULTS AND DISCUSSION

On comparison, serum uric acid and triglyceride were found to be significantly (p < 0.05) higher in CML patients than the controls. Serum cholesterol, HDL Cholesterol and LDL Cholesterol concentrations were decreased significantly (p < 0.05) in CML patients as compared to controls. Hyperuricemia was found in all 35 patients. Serum uric acid was found to be positively correlated with serum triglyceride and negatively correlated with Serum cholesterol, HDL Cholesterol and LDL Cholesterol. Both corrections were found to be highly significant (p < 0.001) (Table 1 and 2).

The present study showed that there was significant change in serum uric acid and lipid parameters in patients with CML. Serum uric acid was positively correlated with TG (p<0.001). Hyperuricemia was found in such patients in this study might, due to chronic hypoxic condition, increased synthesis of uric acid and hypertriglyceridemia in CML patients which corroborates with the work of Musolino et al. and Finarinzo.

Serum cholesterol, HDL Cholesterol and LDL Cholesterol concentrations decreased significantly (p < 0.05) in cases showing the presence of hyperuricemia in patients with CML. Zyada observed relationship between hypocholesterolemia and degree of maturation of leukemic blast cells in acute myelogenous leukemia. Abnormal lipid levels in such patients were found in the present study. It may be caused by elevated LDL receptor activities in malignant cells which corroborates with Peterson et al.

From the above discussion it may be refered that, serum uric acid and lipid parameters, might be working towards the etiopathogenesis of CML even in its early stages. Hyperuricemia and low concentration of serum cholesterol may be deciding factor for progression of the disease. However, this study being done on small population over a short period need further evaluation to stamp status of these parameters as independent risk factor for chronic myelogenous leukemia. The inverse association between cancer and serum cholesterol may reflect a physiological response to the early stage of cancer.

Table 1: Comparison of biochemical parameters in control and patients with CML

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Controls (n = 30)</th>
<th>Patients with CML (n = 35)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ranges</td>
<td>Mean ± SD</td>
</tr>
<tr>
<td>Uric acid (mg/dL)</td>
<td>3.6 – 5.2</td>
<td>4.5 ± 0.6</td>
</tr>
<tr>
<td>Total cholesterol (mg/dL)</td>
<td>120 – 200</td>
<td>160 ± 24.8</td>
</tr>
<tr>
<td>Triglycerides (mg/dL)</td>
<td>38 – 128</td>
<td>79.8 ± 26.2</td>
</tr>
<tr>
<td>HDL Cholesterol (mg/dL)</td>
<td>24 – 52</td>
<td>38.2 ± 9.87</td>
</tr>
<tr>
<td>LDL Cholesterol (mg/dL)</td>
<td>52 – 138</td>
<td>94 ± 24.72</td>
</tr>
</tbody>
</table>

* p < 0.05

Table 2 : Correlation of serum uric acid with lipid parameters in patients with CML

<table>
<thead>
<tr>
<th>Parameters</th>
<th>r</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total cholesterol (mg/dL)</td>
<td>-0.548</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Triglycerides (mg/dL)</td>
<td>+0.502</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>HDL Cholesterol (mg/dL)</td>
<td>-0.621</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>LDL Cholesterol (mg/dL)</td>
<td>-0.804</td>
<td>&lt; 0.001</td>
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REFERENCES


