Atherosclerotic changes in old age and coronary thrombosis are associated with the disorders of lipid metabolism. Decrease in the blood levels of total lipids is believed to help in ameliorating the vascular diseases. Various drugs are known to reduce these levels. Geriforte, an indigenous preparation, is said to have hypolipidaemic effects and hence this work was undertaken to ascertain how far this preparation affects the blood lipid levels in geriatric patients.

MATERIAL AND METHODS
Twenty two male volunteers of ages varying from 50 to 70 years were selected for the present study. Control blood sample was collected from each volunteer in the morning on empty stomach. Serum was separated to determine the lipid profile consisting of (methods in parentheses):

(i) Cholesterol (Zurkowski, 1964)
(ii) Triglycerides (Carlson, 1963)
(iii) Free fatty acids (Trout, 1960 and Joslin, 1971)
(iv) High density (α) and low density (β) lipoproteins expressed as percentage of the total lipoproteins by paper electrophoresis (Durrum E.L., 1955)
(v) Quantitative estimation of β lipoprotein (LDL) by heparin precipitation method (Subba Rao, 1975)
(vi) LDL cholesterol content was calculated by a formula:

\[
LDL \text{ cholesterol} = \frac{\text{Total cholesterol} - \frac{\text{Triglycerides} + 45}{5}}
\]

(Levy et al., 1974).
(vii) Phospholipid (King and Wootton, 1956).

Geriforte was orally administered daily in the dose of 2 tablets twice daily for a period of 6 months. At the beginning and again at the end of 3 months and 6 months of treatment, the serum lipid profile was redetermined.

RESULTS
Prolonged administration of Geriforte showed the following effects on serum lipid profile:

(i) A significant decrease in serum cholesterol level
(ii) A significant decrease in LDL cholesterol
(iii) A significant decrease in serum triglyceride level
(iv) No alteration in serum free fatty acids and phospholipids
(v) No alterations in the levels of serum β lipoproteins.

Table I shows the effect of Geriforte on serum lipid profile. It is seen that the treatment with Geriforte significantly reduced the serum levels of cholesterol, LDL cholesterol and triglycerides as seen after 3 months of treatment and remained low during next 3 months.

DISCUSSION
Geriforte treatment caused a significant lowering of serum cholesterol, LDL cholesterol and triglyceride levels. This finding is consistent with the previous reports of Kulkarni et al. (1975). Sahgal and Sood (1975), Kundu et al. (1976) who reported similar effects in human volunteers.
Table I: Effect of Geriforte on serum lipid profile: Subjects = 22

<table>
<thead>
<tr>
<th></th>
<th>Before treatment</th>
<th>After 3 months</th>
<th>After 6 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Cholesterol (mg % ± S.E.)</td>
<td>240 ± 16</td>
<td>207 ± 8.1 ($p &lt; 0.05$)</td>
<td>206 ± 4.5 ($p &lt; 0.05$)</td>
</tr>
<tr>
<td>Triglycerides (mg % ± S.E.)</td>
<td>86 ± 6.9</td>
<td>72 ± 4.6 ($p &lt; 0.001$)</td>
<td>70 ± 3.5 ($p &lt; 0.001$)</td>
</tr>
<tr>
<td>LDL Cholesterol</td>
<td>167 ± 1.8</td>
<td>152 ± 2.2 ($p &lt; 0.001$)</td>
<td>158 ± 1.3 ($p &lt; 0.001$)</td>
</tr>
<tr>
<td>Free Fatty Acids</td>
<td>0.695 ± 0.013</td>
<td>0.640 ± 0.0023 N.S.</td>
<td>0.786 ± 0.021 N.S.</td>
</tr>
<tr>
<td>Phospholipids</td>
<td>169.59 ± 8.6</td>
<td>162.22 ± 7.9 N.S.</td>
<td>170.28 ± 6.2 N.S.</td>
</tr>
<tr>
<td>β Lipoprotein or LDL</td>
<td>α 26 ± 6.0 (73 ± 7)</td>
<td>β 24 ± 4</td>
<td>α 71 ± 5 N.S.</td>
</tr>
</tbody>
</table>

Cholesterol and β lipoprotein have been claimed to be involved in the pathogenesis of atherosclerosis (Gertler, 1950; Gofman, 1950). Maximum cholesterol is found in β lipoprotein. From our results it seems that even though the level of LDL was not altered significantly, LDL cholesterol content was significantly decreased by the administration of Geriforte.

Chyavanprash and Amla, which are the main ingredients of Geriforte, contain vitamin C (Ascorbic acid). Recent work confirms that vitamin C caused significant lowering of serum cholesterol level (Myasnikov, 1950; Spittle, 1974; Moholkar et al., 1976) and it is effectively used in the prevention and treatment of atherosclerosis.

In our results, this indigenous preparation not only reduced cholesterol levels and LDL cholesterol but also reduced triglyceride levels significantly. The reduction in cholesterol and LDL cholesterol levels might be probably due to the presence of Amla and Chyavanprash which contains vitamin C. However, the amount of vitamin C in this preparation was not determined but is likely to be smaller than doses used by us in previous study or reported in literature. Also vitamin C does not cause reduction of triglycerides but Geriforte does, which indicates that Geriforte has a different mode of action. However, this particular action of lowering cholesterol and triglyceride makes this preparation useful in the treatment of atherosclerosis.

Summary

The clinical efficacy of Geriforte – an indigenous preparation – was evaluated as a hypolipidaemic agent. Twenty-two patients were studied for 6 months. A significant lowering of serum cholesterol, LDL cholesterol and triglyceride level took place. No side effects were noticed.

REFERENCES

1. Carlson, L.A., King Gustaf Res. Inst. and Dept. of Internal Medicine, Karolinska Hospital, Stockholm (Sweden).


