A Prospective Randomised Crossover Study of Propranolol and Abana in Hypertensive Patients: Effect on Lipids and Lipoproteins

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ABSTRACT

A clinical evaluation of combined therapy of the herbomineral preparation Abana with propranolol was done in hypertensive cases with special reference to its effects on lipids and lipoprotein metabolism. Monotherapy with propranolol elevated TC, LDL-c and TG and reduced HDL-c. But just the opposite, viz. a reduction in TC, LDL-c and TG and a rise in HDL-c, was seen when Abana was given along with propranolol. This indicates that combination therapy with Abana neutralizes the adverse effects of propranolol on lipid and lipoprotein metabolism.

INTRODUCTION

Intervention studies of blood pressure reduction have been much less successful in decreasing coronary artery disease (CAD) events. Several studies\(^1\)\(^-\)\(^3\) have shown that though lowering blood pressure (BP) decreases the incidence of stroke, morbidity and mortality rates from CAD have not improved. One possible explanation for this may be that antihypertensive agents used in these trials have, to some extent, adverse effects on blood lipids and lipoproteins which may negate the benefits of therapy\(^4\)\(^-\)\(^6\).

Beta-blockers like propranolol are considered today to be the first choice in antihypertensive monotherapy. Propranolol has been shown to increase serum total cholesterol (TC) and triglycerides (TG), and decrease high density lipoprotein cholesterol (HDL-c)\(^4\)\(^,\)\(^7\)\(^,\)\(^8\).

In this study, the emphasis has been on investigating the combined effect of an indigenous herbomineral formulation Abana with propranolol, and also their isolated actions, on lipid and lipoprotein profiles of hypertensive cases.

MATERIAL AND METHODS

Thirty freshly diagnosed cases of hypertension or angina pectoris, visiting the Psychosomatic and Biofeedback Clinic of the department, were included in the study. Cases with a history of alcoholism or tobacco chewing/smoking were excluded from the study.

The study was divided into two groups:

Group I - Fifteen cases of this group were given 80 mg of propranolol and 6 tablets Abana, in divided dosages, daily for 6 months. Thereafter Abana was withdrawn and propranolol was continued at the same dose for the next 6 months.
Group II - The remaining 15 cases first received propranolol, in the same dose as in Group I for 6 months, after which Abana was additionally introduced, in the same dosage as in Group I, for a further 6 months.

All the cases were advised to maintain a stable diet during the study period. They were followed up at the end of the 3rd, 6th, 9th and 12th months to check if the patients’ clinical status was satisfactory, to make any dose adjustments that might have become necessary and to check patient compliance. TC\(^9\), TG\(^10\), HDL-c\(^{11}\) and LDL-c\(^{12}\) of every case was measured on each follow-up. Patients were asked to come for blood and other clinical examinations following overnight fasting. Statistical analysis of the data was done by applying the paired ‘t’ test.

Some of the major herbal ingredients present in Abana include *Terminalia arjuna*, *Withania somnifera*, *Nepeta hindostana*, *Phyllanthus emblica*, *Terminalia chebula*, *Eclipta alba*, *Glycyrrhiza glabra*, *Boerhaavia diffusa*, *Asparagus racemosus* etc.

RESULTS

Group I - Cases on combined therapy (Abana plus propranolol) showed decreases in TC and TG by 11.30% and 32.03% (\(p<0.001\)) respectively, but an increase in HDL-c by 28.82% (\(p<0.001\)) for the first 6 months. Withdrawal of Abana over the next 6 months resulted in increases in TC and TG by 18.57% (\(p<0.01\)) and 25.52% (\(p<0.05\)) respectively, whereas HDL-c was observed to decrease by 12.82% (\(p<0.01\)) (Table 1).

Group II - Monotherapy with propranolol for the first 6 months showed increases of 11.31% (\(p<0.001\)) and 16.21% (\(p<0.05\)) in TC and TG respectively and a decrease of 20.15% (\(p<0.05\)) in HDL-c. But combined therapy of propranolol and Abana for the second 6 months resulted in 18.14% (\(p<0.001\)) and 42.20% (\(p<0.01\)) decreases in TC and TG respectively and 9.98% (\(p<0.02\)) increase in HDL-c (Table 2).

### Table 1: Effect of propranolol + Abana and then propranolol alone on TC, LDL-c, HDL-c, TG and TC/HDL-c levels

<table>
<thead>
<tr>
<th></th>
<th>Initial readings</th>
<th>Propranolol + Abana (1st six months)</th>
<th>Propranolol alone (2nd six months)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TC</td>
<td>218.24 ± 48.41(^*) (14)</td>
<td>186.58 ± 32.50(^*) (13)</td>
<td>212.16 ± 17.41(^*) (12)</td>
</tr>
<tr>
<td>LDL-c</td>
<td>123.04 ± 62.84(^*) (11)</td>
<td>160.68 ± 31.20(^*) (12)</td>
<td>134.15 ± 17.66(^*) (11)</td>
</tr>
<tr>
<td>HDL-c</td>
<td>47.96 ± 9.71(^a) (14)</td>
<td>56.36 ± 10.26(^a) (12)</td>
<td>51.72 ± 7.39(^a) (12)</td>
</tr>
<tr>
<td>TG</td>
<td>144.78 ± 52.91(^b) (11)</td>
<td>100.00 ± 32.12(^b) (12)</td>
<td>125.90 ± 39.30(^b) (11)</td>
</tr>
<tr>
<td>TC/HDL-c</td>
<td>4.69 ± 1.25 (14)</td>
<td>3.39 ± 0.79 (12)</td>
<td>4.20 ± 0.83 (12)</td>
</tr>
</tbody>
</table>

Comparison: \(^*\), \(^\cdot\), \(^\cdot\) vs d, a, b, \(p<0.001\)

\(^*\) vs c, a vs e, \(p<0.01\)

b vs f, \(p<0.05\)

Number of patients in parentheses
Table 2: Effect of propranolol alone and then propranolol + Abana on TC, LDL-c, HDL-c, TG and TC/HDL-c levels

<table>
<thead>
<tr>
<th></th>
<th>Initial readings</th>
<th>Propranolol alone (1st six months)</th>
<th>Propranolol + Abana (2nd six months)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TC</td>
<td>225.45 ± 35.25</td>
<td>244.88 ± 33.71*</td>
<td>205.99 ± 38.11c</td>
</tr>
<tr>
<td></td>
<td>(14)</td>
<td>(14)</td>
<td>(11)</td>
</tr>
<tr>
<td>LDL-c</td>
<td>141.67 ± 42.27*</td>
<td>160.79 ± 36.24*</td>
<td>112.10 ± 26.52d</td>
</tr>
<tr>
<td></td>
<td>(11)</td>
<td>(11)</td>
<td>(8)</td>
</tr>
<tr>
<td>HDL-c</td>
<td>51.40 ± 13.97*</td>
<td>39.86 ± 7.09*</td>
<td>45.91 ± 9.48e</td>
</tr>
<tr>
<td></td>
<td>(14)</td>
<td>(14)</td>
<td>(11)</td>
</tr>
<tr>
<td>TG</td>
<td>153.33 ± 13.97</td>
<td>169.90 ± 51.66b</td>
<td>148.87 ± 51.26f</td>
</tr>
<tr>
<td></td>
<td>(11)</td>
<td>(11)</td>
<td>(8)</td>
</tr>
<tr>
<td>TC/HDL-c</td>
<td>4.63 ± 1.31</td>
<td>6.34 ± 1.57</td>
<td>4.70 ± 1.55</td>
</tr>
<tr>
<td></td>
<td>(14)</td>
<td>(14)</td>
<td>(11)</td>
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Comparison: *, # vs c, , , vs d, \( p<0.001 \)
\# a vs b, \( p<0.05 \)
\( b \) vs f, \( p<0.01 \)
\( \# \) vs e, \( p<0.02 \)

Number of patients in parentheses

The ratio TC/HDL-c increased with propranolol and after withdrawal of Abana from combined therapy, but dropped when Abana was added to propranolol therapy. This increase or decrease in the ratio was statistically insignificant.

**DISCUSSION**

Many of the major antihypertensive drugs have adverse effects on serum lipid levels, which though moderate may translate into a significant effect on CAD morbidity and mortality. Beta-receptor stimulation produces activation of the lipoprotein lipase. Depression of this enzyme’s activity results in increase in TG due to depressed catabolism of TG in very low density lipoprotein and chylomicrons, and fall in HDL-c. Propranolol, the commonest beta-adrenergic blocking agent, has been reported to decrease HDL-c by 10 to 20% and increase TG by 25 to 100%\(^{4,7,8}\).

Abana, the Ayurvedic formulation, has been reported to possess antihypercholesterolaemic and cardioprotective properties\(^{13-16}\). In this study, combined therapy of Abana and propranolol brought about decreases in TC and TG and increase in HDL-c levels, whereas withdrawal of Abana, leaving patients on propranolol alone, did the opposite - increases in TC and TG and decrease in HDL-c levels.

In view of the emerging knowledge of the effects of antihypertensive agents on the end points of cardiovascular disease, the effects of specific agents on plasma lipids and lipoprotein levels must be taken into account when choosing therapy aimed at reducing all the catastrophic consequences of hypertension and hyperlipidaemia. The Framingham Heart Studies have proposed that the ratio of TC (or LDL-c) to HDL-c may be better predictors of coronary risk than TC or any of the lipoprotein cholesterol levels alone. It has the advantage of simplified calculation and applicability in different forms of hyperlipidaemia. In this study, Abana seemed to favourably modify the TC/HDL-c ratio.

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REFERENCES


