The Effect of *Teucrium Polium* Extract on Blood Sugar and Insulin Level of Type II Diabetic Patients

M. Soheil, M.D. A. Ansari Asl, M.D., M. Azadbakht, Pharm.D., Ph.D., Gh. R. Omrani, M.D., S. Samani Mohammadi, Pharm.D., Ph.D.*

**Abstract**

**Background:** In traditional medicine, *Teucrium Polium* (TP) has been known as an antidiabetic plant and has a folk reputation as a hypoglycemic agent and it is widely used by diabetic patients in Iran and other Middle East countries.

**Objective:** Evaluation of hypoglycemic effect of *Teucrium polium* in Shiraz used traditionally to reduce blood glucose level.

**Methods:** The study was done on 32 cases with two subgroups: patients and control group. Patients received 0.4 gram of dried alcoholic extract of TP equivalent to 1.6 gm dry plant orally, two time daily and control group received placebo for two weeks. Results of insulin and blood sugar obtained before and after TP consumption, and fasting and 2 hours after standard diet, were compared with paired t test.

**Results:** There was no significant change in fasting blood sugar (0.05<P<0.1), post-prandial blood sugar (0.1<P<0.2), fasting insulin level (P>0.5) and post prandial insulin (P>0.2).

**Discussion:** In some experimental studies, use of TP extract has resulted in significant drop of blood sugar in lab. animals. The doses used in these studies were very high and resulted in significant hepatic damage. There is a report of hepatic damage in human after using TP.

**Conclusion:** Considering the result of this study and occasional serious hepatic complication of TP, its use by diabetic patients should be discouraged.

**Key words:** Teucrium polium, diabetes mellitus

**Introduction**

*Teucrium polium* (TP) or polygermander (in Persian: Arpeh or kalporeh and in Arabic: hashishatollah) is a member of labiate family and has been used in traditional medicine for many purposes such as an antihypertensive, calcium antagonist, anti-convulsant, antibacterial, anti-inflammatory, analgesic, anti-diarrheal and for treatment of diabetes mellitus worldwide.

In the south of Iran, experimental trials have been shown that high doses of TP can decrease blood sugar in streptozocine induced diabetic animals. The aqueous extract of the dried aerial parts of TP is used by many type II diabetic patients particularly in Southern Iran as an antidiabetic drug. There has been no previous study on the effect of commonly used doses of TP on humans, and this study which reports the effect of TP on insulin and blood sugar of type II diabetes mellitus in humans is the first report.

**Patients and Methods**

TP used in this study was naturally growing around Shiraz and was harvested during June and July. The species were identified and verified by botanists at Shiraz University. The flowering tops of plant was dried, pulverized and alcoholic extract was prepared by percolation method. The extract was dried and mixed with dibasic calcium phosphate (Merck) and was filled in capsules, equivalent of 1.6 gram of crude plant powder. Insulin kit for insulin determination was obtained from Immunotech Co. (Switzerland). Blood insulin was measured with RIA method and glucose measured by automated glucose oxidase.

**Patient and Control groups:** 32 type II diabetic patients, 30 females and 2 males, with mean age of 48±6.5 years, were selected randomly and divided to two subgroups, 19 patients and 13 control. Due to ethical considerations only patients who have been frequent users of TP were enrolled in this study. The study was explained to each patient and written consent was obtained. The study was approved by Ethical Committee of Shiraz University of Medical Sciences. The patients were asked to discontinue TP for 2 months (washout period) prior to study and continue oral hypoglycemic agent as before. Then baseline fasting and 2 hours post 500 kcal, mixed meal blood samples were taken and the samples were kept at 20°C. They were received dried alcoholic extract of TP equivalent to 1.6 gram of crude plant powder twice a day (3.2 grams per day) for 2 weeks. This dose was based on the doses commonly prescribed by the major herbal apothecaries in Shiraz. After two weeks of treatment with TP, fasting and postprandial blood samples were taken. Then results of
baseline and post-treatment samples were compared with paired t test.

Results
The effects of the dried alcoholic extract of T.P equivalent to 1.6 gram of crude plant powder twice a day for 2 weeks on serum glucose and insulin level of type II diabetic patient are shown in tables 1 and 2. None of the changes were statistically significant.

Discussion
T.P. extract contains a wide range of active pharmacologic agents including alkaloids, glycosides, terpenoids, sterols, triterpenes and flavonoids. In animals models, the flavonoids increase insulin secretion from the beta cells of pancreas and this may explain the antidiabetic effect of T.P. One of such flavonoids is quercetin which has hypoglycemic effect in rats. Two other terpenoids also have been shown can decrease blood sugar in animal studies. However Gharalbehe et al reported that intraperitoneal and intravenous injection of T.P extract resulted in significant decrease in blood sugar and it was concluded that this effect was due to increased sensitivity of peripheral tissues to insulin rather than increased insulin secretion. Yaniv et al have also reported significant antidiabetic effect of T.P.

In a study in Kerman-Iran, it was reported that T.P which was secured from Kerman area causes regeneration of beta cells causes significant decrease in glucose level in streptozocin induced diabetic rats. In another study in Shiraz, it was shown that aqueous extract of T.P from Kerman had significant antidiabetic effects in animals too but T.P from Shiraz lacked this effect. This difference has been attributed to higher soil content of micronutrients such as chromium, zinc, and calcium which can modulate the hypoglycemic effects of herbs. In this report animals which received high doses of T.P died after 48 hours and their liver had necrotic changes. In our study, there was no significant hypoglycemic effect after administration of T.P. extract equivalent to 3.2 gm/day of crude powder and the discrepancy with animal studies can be explained by dose difference. The doses per kilogram body weight used in animal studies were much higher than that used in our study. Occasional severe hepatic damage after consumption of T.P in humans leading to liver transplantation has been reported. However none of our patients had any abnormality in hepatic function. Hepatotoxicity may be due to presence of several neolecitosene diterpenoids. In animal studies therapeutic doses of T.P causes hepatocellular necrosis. Therefore this potential hepatotoxicity precludes use of higher doses of T.P. in humans.

<table>
<thead>
<tr>
<th>Table 1: Comparison of results of fasting and two hours postprandial plasma glucose level in patients and control group.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient’s fasting plasma sugar (mg/dl)</td>
</tr>
<tr>
<td>191.08±48</td>
</tr>
<tr>
<td>Patient’s 2hrs post prandial plasma sugar (mg/dl)</td>
</tr>
<tr>
<td>Control fasting plasma sugar (mg/dl)</td>
</tr>
<tr>
<td>Control 2hrs postprandial plasma sugar (mg/dl)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 2: Comparison of results of fasting and two hours postprandial plasma insulin level in patients and control group.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient’s fasting plasma insulin (µu/ml)</td>
</tr>
<tr>
<td>9.86±6.1</td>
</tr>
<tr>
<td>Patient’s 2hrs post prandial plasma insulin (µu/ml)</td>
</tr>
<tr>
<td>Control fasting plasma insulin (µu/ml)</td>
</tr>
<tr>
<td>Control 2hrs post prandial insulin (µu/ml)</td>
</tr>
</tbody>
</table>

Archive of SID

Conclusion
Considering lack of effect of commonly used doses of T.P. on blood sugar in diabetic patients and its potential hepatotoxicity, the use of this herbal medicine by public should be discouraged.

References