

Effect of Consumption of Powdered Fenugreek Seeds on Blood Sugar and HbA1c Levels in Patients with Type II Diabetes Mellitus

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ABSTRACT

Background: Since a long time herbal medicines have been used in the management of diseases. We conducted a study to ascertain if different quantities of powdered Fenugreek seeds taken orally, had any effect on the blood sugar profiles and glycosylated haemoglobin (HbA1c) levels in stable, uncontrolled type II diabetic patients.

Methods: 42 patients who attended the outpatient clinic at the hospital were chosen for the study based upon certain definite criteria. They were then divided into 3 groups. Group I comprised 14 patients who were fed 10gm of the powdered fenugreek seeds per day. Group II comprised 14 patients who were fed 20gm of the powdered fenugreek seeds per day. Group III comprised 14 patients who were not fed with any powdered fenugreek seeds but were continued on the diet and drug regimen already prescribed. Patients were assessed for 6 weeks fortnightly. HbA1c was estimated initially and then at the end of 6 weeks by HPLC method. Blood glucose was periodically estimated along with clinical assessment, dietary survey and laboratory studies.

Results: Of the 42 patients chosen for the study only 35 completed the study. The blood sugar levels in-groups II showed a significant drop in fasting sugar levels but the decrease was insignificant in Group I and III. The difference in HbA1c levels was statistically insignificant.

Conclusion: At present there seems to be no justification for using this agent in patients who have significant impairment in glucose tolerance.

INTRODUCTION

Diabetes mellitus or "Madhumeha" as the good old Indian physicians in ayurveda had called it, is a common chronic metabolic disorder. Since long a number of herbal medicines like periwinkle (a flower found in the Phillipines), gourd juice and

fenugreek have been used in the management of such a disease.

Fenugreek – *Trigonella foenum graecum* – is an annual herb belonging to family Leguminosae found wild and extensively cultivated in many parts in India. Two fairly distinct types of plants are recognised, the dwarf type grown for culinary purposes and the tall type grown for medicinal purposes. The seeds of this plant contain an alkaloid trigonelline and another compound known as choline (1, 2). These seeds have been reported to be diuretic, anti-tussive and hypoglycaemic in nature. We thought it was worthwhile to see the effect of consumption of different quantities of powdered fenugreek seeds in blood sugar profiles and glycosylated haemoglobin (HbA1c) levels in stable uncontrolled type II diabetics.

PATIENT POPULATION AND METHODS

42 patients of type II diabetes mellitus who attended the outpatient Department of Endocrinology at the Institute of Medical Sciences, Srinagar were studied. The criteria for admission into the trial were:

1. Stable uncontrolled diabetes mellitus.
 2. Willingness to comply with the treatment protocol.
 3. Absence of any significant complications like neuropathy, neuropathy and retinopathy.
 4. Absence of ischaemic heart disease, autonomic dysfunction or on historical grounds alone.
 5. Pregnant and lactating women were not included.
 6. Inability to be controlled on calculated diet alone for about a month.
 7. Fasting blood sugar more than 120 mg/dl and/or postprandial blood sugar of more than 140 mg/dl.
- These 42 patients were divided into three groups:

Group I: Comprised 14 patients who were fed 10gm of the powdered fenugreek seeds per day. They were advised to take it in two divided doses.

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Group II: Comprised 14 patients who were fed 20 gms of the powdered fenugreek seeds and were advised to take it in 2-4 divided doses per day. This was done to increase the compliance as the quantity of fenugreek was large and the powder bitter.

Group III: Comprised 14 patients who were not fed with any powdered fenugreek seeds but continued on the diet and drug regimen already prescribed to them.

There were 7 dropouts from the study viz, 4 from Group I and 3 from Group II. There were no dropouts from Group III.

Patients were assessed initially and then for subsequent 6 weeks on fortnightly basis. This included clinical assessment, dietary survey and laboratory studies including fasting and postprandial blood glucose. HbA1c was estimated initially and then at the end of 6 weeks. Blood glucose was estimated by glucose oxidase method with the help of Dextrostix and read on a Glucometer, whereas HbA1c was estimated by high performance liquid chromatography (HPLC) method on an automated HbA1c apparatus.

RESULTS

TABLE 1
Distribution of patients according to age

Age	Group I	Group II	Group III	Total
Upto 40 years	4	7	6	17
40-60 years	5	2	5	12
above 60 years	1	2	3	6
	10	11	14	35

TABLE 2
Distribution of patients according to sex

Sex	Group I	Group II	Group III	Total
Male	5	7	4	16
Female	5	4	10	19
	10	11	14	35

TABLE 3
Blood sugar profile in patients during 6-week study period

Blood glucose	Group I Mean±SD	Group II Mean±SD	Group III Mean±SD
Initial			
Fasting	139±33.4	175±74.2	143±52.6
PP	172±69.5	199±77.2	172.5±59.5
2 Weeks			
Fasting	125±28.3	145±8.12	137±53.9
PP	226±80.0	184.2±63	170.3±61
4 Weeks			
Fasting	113.5±28.8	125±56.4	135±80.8
PP	191.5±66.0	178.3±50.7	166±64.6
6 Weeks			
Fasting	121.3±25.1	108.5±31.4	125±56.2
PP	190.7±79.4	187.1±56.6	159±56.2

Initial vs final blood glucose: p value not significant except for fasting blood glucose in group II where p<0.05

TABLE 4
Mean HbA1c initially and at the end of 6 weeks

Group	Total	Initial levels Mean ± SD	Final levels Mean ± SD
I	10	8.24 ± 1.9	7.7 ± 1.7
II	11	10 ± 3.6	9.6 ± 3.5
III	14	8.15 ± 2	7.9 ± 1.98

Initial vs final HbA1c : p value not significant

This study was conducted on 42 patients. Only 35 completed the study. The age and sex distribution is given in Table 1 and Table 2. During the study period there was no change in the caloric consumption and body mass index (BMI). Laboratory parameters in the form of urinary albumin, urea, creatinine, electrolytes, electrocardiogram and X-ray chest were found to be normal. The blood sugar profile during the study period in various groups is given in Table III. From this table it is clear that in Groups I there was no significant difference in fasting as well as post-prandial blood sugars before and after fenugreek therapy. In groups III there was a mild decrease in fasting as well as postprandial blood sugars probably because of better compliance with diet and drugs during this

follow up period. HbA1c levels in these three study groups prior to the initiation of study and at the end of the study are shown in Table 4. This Table shows a decreasing trend in all the three groups in HbA1c levels but on statistical evaluation, the difference was found to be insignificant. Probably it would have been more fruitful to study this parameter for a period of 12 weeks instead of 6 weeks.

DISCUSSION

The role of fenugreek in the management of diabetes mellitus has been a matter of debate for long in the Indian system of medicine. Various studies have been conducted to see the effect of a high fibre diet, fenugreek and other herbal agents in the management of diabetes mellitus. In one study it was shown that patients given 25gm of fenugreek a day for 3 weeks showed remarkable improvement in plasma glucose levels (2), whereas in another study a remarkable symptomatic relief was observed in diabetics given fenugreek (3). From this study it is clear that small doses (10 gm/day) of fenugreek did not have any significant effect on blood sugar profiles whereas large doses (20 gms/day) did produce significant reduction in fasting blood sugars. The effect on glycosylated HbA1c was not statistically significant in any group. However, it would be worthwhile to continue the study for a minimum period of 12 weeks and see the effect of large doses of fenugreek on HbA1c. A study in dogs showed that fenugreek intake

causes reduction in blood sugar levels, plasma glucagon and somatostatin (4). It looks quite possible that there is some active hypoglycaemic agent in fenugreek but its characterisation, isolation and assessing its therapeutic efficacy would need further studies. Taking the magnitude of type II diabetes mellitus into consideration, it would be worthwhile to further explore this substance if nothing else at least for economic considerations in developing countries where it is cheaply available and easily acceptable.

But at present there seems to be no justification for the use of these agent inpatients who have significant impairment in glucose tolerance.]

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