

Research Article

Effect of Metformin Vs. *Eclipta alba* on Blood Glucose Level in Diabetic Patients

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ABSTRACT

With advantage of a quick relief allopathic drugs are causing for serious disease with long or short term relief. To avoid these side effects, its need to move towards the Ayurvedic treatment by natural products. Previous studies showing use of many natural product against the lethal diseases. Diabetes is also a such type of emerging disease, needs to be cured by allopathic as well as ayurvedic drugs. Present study aimed to compare the effectiveness of herbal drug *Eclipta alba* with an allopathic drug metformin against the diabetes.

Key-word: *Eclipta alba*, metformin, Ayurveda, Allopathic, Diabetes.

INTRODUCTION

Diabetes is carbohydrate metabolic syndrome resulting in abnormal high blood sugar level (hyperglycemia). Causative factors may be hereditary, increasing age, disturbed diet, imperfect digestion, obesity, sedentary lifestyle, stress, drug-induced, infection in pancreas, hypertension, high serum lipid and lipoproteins, less glucose utilization and other factors. The diabetic patients are increasing spontaneously in India. It can be treated by several synthetic as well as the natural drugs. Now a day people are coming back towards the natural drugs in spite of the synthetic drugs available in the market to avoid the side effects as well as to save the money¹⁻². While on other hand patients are also using allopathic medicines to save time as well as instant relief with ignorance of the side effects.

So many weeds which are found throughout the India are playing an important role in treatment of the diseases. One of them is *Eclipta alba* (Bhringaraj) commonly used as medicinal herb³. Almost all of its parts are used in traditional system of medicine including seeds, roots and shoots and leaves. A number of phytochemical constituents have been isolated from the plants which possess pharmacological activities like antibacterial, antifungal, diuretic, antiinflammatory, hepatoprotective, anti-venomous, analgesic, anticancerous and various other important medicinal properties⁴⁻⁵. Due to equal importance of the allopathic drugs as anti-hyperglycemic agent metformin is also used in treatment of the diabetes. Metformin, a biguanide derivative (dimethylbiguanide), is one of the most commonly used drugs for the treatment of type II diabetes⁶, through increased insulin independent glucose uptake in peripheral muscle⁷. Moreover, it can also increase glucose uptake in skeletal muscles⁸. Furthermore, metformin is able to reverse insulin resistance and

hyperglycemia in high risk subjects for type II diabetes mellitus⁹. Metformin has beneficial effects on lipid levels, so it is the first choice in the treatment of overweight people with type II diabetes¹⁰⁻¹¹. Present study aimed to compare the effectiveness of herbal drug *Eclipta alba* with an allopathic drug metformin against the diabetes.

MATERIAL AND METHODS

The study was conducted in Department of Medicine & Department of Pharmacology, King George's Medical University, Lucknow. Study was started after taking ethical clearance from Institutional Ethical Committee. Newly diagnosed subjects with type 2 diabetes were recruited from the OPD of the Medicine Department of King George's Medical University. The total duration of study was 11 months.

Subject Selection

Patients were included in the study after fulfilling inclusion criteria with age group 20-60 years, of either sex; Newly diagnosed diabetic; with fasting blood glucose range 120-135mg/dl and post prandial blood glucose range 160-210mg/dl; without chronic diseases like hypertension, CHF, epilepsy and psychiatric disorder. And exclusion criteria with age >60 & <20 years; Pregnant and lactating females; allergic to any ingredient of the drug; concomitant drugs like antiepileptics, antipsychotics, antihypertensive, antiasthmatics, corticosteroids etc.; having Co-morbidities; Uncooperative not ready to give written informed consent.

Study Design

Patients were randomly divided into two groups. Randomisation was done by computer generated program. Group 1: Total 24 patients enrolled during start of the study. 19 patients completed the study while 5 patients were lost in follow up (dropouts). Patients were prescribed

Table 1: Blood Glucose Levels Change in Patients

Patients Follow-ups	Blood Glucose Levels			
	Fasting		Post-prandial	
	Group I (Mean±SD) (n=19)	Group II (Mean±SD) (n=18)	Group I (Mean±SD) (n=19)	Group II (Mean±SD) (n=18)
Baseline	124.40±37.28	126.95±36.91	198.77±45.82	205.20±46.50
One month	119.24±25.46*	122.45±34.67**	177.14±24.47*	194.45±33.67**
Two month	116.45±23.67*	119.89±28.78**	166.43±22.67*	179.19±30.77**
Three month	108.16±21.46*	109.78±30.78**	147.16±21.56*	149.18±31.48**

*p<0.01, **p<0.05 (Significant, multiple comparison test)

Table 2: Percent decrease in blood glucose level in Patients from baseline to follow-ups

Blood Glucose	Treatment groups	Baseline vs One month (Mean±SD)	Baseline vs two month (Mean±SD)	Baseline vs three month (Mean±SD)
Fasting	Group I	3.3±0.3*	5.7±0.6*	14.5±1.6**
	Group II	3.2±2.4*	5.6±1.4*	13.9±5.14**
Post-prandial	Group I	12.1±4.4**	17.7±7.3**	27.4±6.2**
	Group II	5.5±1.2*	12.5±6.2**	25.6±7.2**

standard antidiabetic therapy metformin in dose of 500 mg – trade name glycephage SR (Franco Indian), ones daily after meals in morning purchased from government authorised pharmacy.

Group 2: Total 24 patients enrolled during start of the study. 18 patients completed the study while 6 patients were lost in follow up (dropouts). *Eclipta Alba* extract was given in the form of capsule, administered orally in a dose of 800 mg three times a day (calculated from previous studies), purchased from Fortune Herbal Care Pvt. Ltd. Ghaziabad.

Sample Collection and Serum Separation

After overnight fasting, 1.5 ml of venous blood sample was collected from the patients on day 0 for baseline estimation of blood glucose. After collection of fasting blood samples patients were given 75 gms of oral glucose with 200 ml of water patients were advised to take rest for 2 hours for collection of second blood sample. After 2 hours of glucose intake 2 ml of blood was collected for postprandial blood glucose estimation. After collection of blood samples as day 0 patient were given treatment. They were asked to come after 30 day, 60 day and 90 days for fasting and postprandial blood glucose level estimation.

Biochemical Analysis

The biochemical estimation of the samples was done in the Department of Pathology, King George's Medical University, Lucknow.

Estimation of blood glucose

The Fasting blood glucose levels were estimated using a standard commercial Eco-Pak Glucose kit (Accurex Biomedical Pvt. Ltd.). It was based upon an enzymatic method using Glucose Oxidase and Peroxidase enzyme and a spectrophotometer.

Statistical analysis

The results are presented in mean, SD and percentages. The paired t-test is being used to compare the changes in the lipid levels from baseline to follow-ups. The p-value<0.05 is being considered as significant. All the analysis is carried out by using SPSS 16.0 version.

RESULTS

The fasting blood glucose (FBG) levels were similar in both groups at the baseline. There was significant (p<0.05) difference in the FBG levels between Group I (119.24±25.46) and Group II (122.45±34.67) at one month. Similar observation was found at two and three month (Table-1). The post-prandial blood glucose (PPBG) levels were similar in all the groups at baseline. There was significant difference (p<0.05) in the PPBG levels between Group I (177.14±24.47) and Group II (194.45±33.67) at one month. Similar observation was found at two and three month (Table-1). There was 3.3% decrease in fasting blood glucose from baseline to one month in Group I which was 3.2% in Group II. The decrease was statistically significant both groups (p<0.05, p<0.01). A significant decrease from baseline to two and three month was found in all the groups (Table-2). There was 12.1±4.4 % decrease in post-prandial blood glucose level from baseline to one month in Group I which was 5.5±1.2 % in Group II. The decrease was statistically significant in both groups (p<0.05). A significant decrease from baseline to two and three month was found in both Groups (Table-2).

DISCUSSION

The Present study has been conducted to evaluate the antihyperglycaemic effect of an allopathic drug metformin and compared with that of an indigenous plant *Eclipta alba*. Patients fulfilling the proposed inclusion/exclusion criteria were enrolled in study after their written informed consent. There was no significant difference in reduction of fasting blood glucose in *Eclipta alba* and metformin group. These results showed that antihyperglycemic activity of *Eclipta alba* is comparable to that of metformin. As same above there was no significant difference in reduction of post prandial blood glucose levels in both groups. These results also suggest that *eclipta alba* produced antihyperglycemic activity comparable to that of metformin. So antihyperglycemic action of *eclipta alba* is

significant. These results are consistent with studies done before⁵. *Eclipta alba* a commonly used in several form in treatment many diseases because of the so many important phytochemicals as Coumestans¹²; Terpenoids and their glycosides; Alkaloids¹³; Volatile oils¹⁴; Saponins¹⁵; Tannins; and lignin¹⁶. Possible mechanisms for antihyperglycemic action of *Eclipta alba* based on previous studies are as decrease intestinal absorption of glucose¹⁷⁻¹⁹; Initiating release of insulin¹⁹; Insulin sensitizing activity¹⁹; and Flavonoids suppress blood glucose level²⁰⁻²¹. Metformin reduces blood glucose levels by inhibiting hepatic glucose production and reducing insulin resistance, particularly in liver and skeletal muscle²²⁻²³. Metformin decreases intestinal absorption of glucose, and increases insulin sensitivity by enhanced glucose uptake and utilization in peripheral tissues. *In vitro* and *in vivo* studies have demonstrated the effects of metformin on membrane-related events, including plasma membrane fluidity, plasticity of receptors and transporters²⁴; suppression of the mitochondrial respiratory chain²⁵; increased insulin-stimulated receptor phosphorylation and tyrosine kinase activity²², stimulation of translocation of GLUT4 transporters to the plasma membrane²⁶; and enzymatic effects on metabolic pathways, e.g., LKB1 activation of AMP-activated protein kinase – AMPK which inhibits gluconeogenesis and lipogenesis²⁷.

CONCLUSION

The present study showed that the *Eclipta alba* can be compared with metformin in effectiveness against the diabetes. As previous studies have showed the importance of the *Eclipta alba* against so many diseases, so its need to explore more studies.

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