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Antihypertensive and other Beneficial Health Effects of Rutin Supplementation in Diabetic Patients

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ABSTRACT

The objective of this study was to investigate the effect of Rutin supplementation Tablets in Diabetic patients. The trial was carried out with 4 intervention periods of 30 days each. 40 patients with type-II diabetes mellitus ageing between 40-60 years old were selected at random. These patients were supplemented with Rutin over the period of 120 days without altering their regular medications. Fasting Blood Sugar level (FBS) was measured at every 30 days and glycated hemoglobin (HbA1C), Lipid Profile, Serum Urea, Serum Creatinine, Serum Electrolytes & Body Mass Index (BMI) were measured at baseline and after every 60 days i.e. on 60th & 120th days of Rutin supplementation. The same patients were stopped supplementation of Rutin for next 120 days and the investigation was carried out again at the end i.e. on 180th and 240th day. FBS & HbA1C decreased considerably with rutin supplementation. On the basis of the trial it can be concluded that Rutin Supplementation has the effect of hypoglycemic activity in diabetic patients.

Keywords: Rutin, FBS, HbA1C, Serum urea, Serum Creatinine, Serum electrolytes, Lipid Profile.

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INTRODUCTION

Rutin is a natural bioflavonoid and a water-soluble antioxidant. Rutin is phenolic antioxidant and has been demonstrated to scavenge superoxide radicals. Rutin occurs in Buckwheat seed, Eucalyptus leaves, fruits and fruit rinds, especially citrus fruits and rinds (orange, grapefruit, lemon, and lime).

Diabetes is a globally common metabolic disorder affecting over two million people in the UK alone. Over 30 million have now been diagnosed with diabetes in India. The CPR (Crude prevalence rate) in the urban areas of India is thought to be 9 per cent. In rural areas, the prevalence is approximately 3 per cent of the total population. The estimate of the actual number of diabetics in India is around 40 million.

Diabetes is a long-term (chronic) condition caused by too much glucose (sugar) in the blood. It is also sometimes known as diabetes mellitus. It is also known as type 2 diabetes. The amount of sugar in the blood is controlled by a hormone called insulin, which is produced by the pancreas. When food is digested and enters the bloodstream, insulin helps to move any glucose out of the blood and into cells, where it is broken down to produce energy.

However, in diabetes, because there is either not enough insulin, or because there is a poor response (resistance) to insulin, the body is unable to fully use the glucose in the blood stream. There are two types of diabetes: diabetes type 1 and diabetes type 2. This article focuses on type 2 diabetes.

DESIGN AND METHODS

This study was a randomized controlled implementation trial at Rajah Muthiah Medical College Hospital, Annamalai University, Annamalainagar. Forty diabetic patients participated in this case study. Cases were chosen from the DIABETIC OP of Rajah Muthiah Medical College Hospital, Annamalai University, Annamalainagar, Tamilnadu by simple randomized sampling.

On an average all of these forty patients are of from rural area and their life styles and physical activities were more of less similar to one another. The subjects consisted of 40 patients presenting with normal blood pressure, normal total cholesterol. Detailed information on each patient's age, sex, type and duration of diabetes mellitus, mode of treatment degree of blood glucose, blood pressure, and lipids profile was recorded accordingly. A baseline detailed and elaborate physical examinations were carried out and Fasting Blood Sugar level (FBS) was measured at every 30 days and glycated hemoglobin (HbA1C), Lipid Profile, Serum Urea, Serum Creatinine, Serum Electrolytes & Body Mass Index (BMI) were measured at baseline and after every 60 days i.e. on 60th & 120th days of Rutin supplementation. The same patients were stopped supplementation of Rutin for next 120 days and the investigation was carried out again at the end i.e. on 180th and 240th day.

All of these 40 patients were given Rutin supplementation Tablets in 500 mg caplets (RUTIN 500 mg, Natural Bioflavonoid, manufactured by Nutraceutical Corp., USA for 120 days to be taken once a day. All necessary data were retrieved from the patient records in the DIABETES OP of Rajah Muthiah Medical College Hospital, Annamalai University, Annamalainagar, Tamilnadu (India).

Blood Pressure was measured using a Standard Mercury Sphygmomanometer (ERKAMETER 3000, Wall modal, Richard Kallmeyer, Nachforschung, Badtolz, Germany). Venous blood was collected after an overnight fast of at least 8 hours into Heparin Tubes. Total Cholesterol (TC), High Density Lipoprotein Cholesterol (HDL), Triglycerides (TGL), and Low Density ipoprotein Cholesterol were analyzed with RA-50 Semiautomatic analyzer (Bayer, Leverkusen, Germany).

Low Density lipoprotein (LDL) Cholesterol and very low density lipoprotein (VLDL) Cholesterol were calculated as follows:

VLDL-C = triglycerides/5
LDL-C = Total Cholesterol – (HDL-C + VLDL-C)

Height and Weight was measured using portable vertical measuring board and household scale respectively. Patients were weighed wearing light cloths and without slippers.

The Body Mass Index (BMI) was measured as follows:-

Body Mass Index (BMI) = Weight in Kilograms/Square of height in meters.

Electrolytes are positively and negatively charged molecules called ions that are found within the body's cells and extracellular fluids, including blood plasma. A test for electrolytes includes the measurement of sodium, potassium, chloride, and bicarbonate. Electrolyte concentrations are similar whether measured in serum or plasma. Values are expressed as mmol/L for sodium, potassium, chloride, and bicarbonate. The balance of the electrolytes in our bodies is essential for normal function of our cells and our organs. Common electrolytes include sodium, potassium, chloride, and bicarbonate. The functions and normal range values for these electrolytes are important, and if an electrolyte is at an extreme low or high, it can be fatal.

The Normal range of HbA1C is 4.0-6.0%. The normal fasting blood sugar level is 70–110mg/dl. A Normal blood sodium level is 135–145 milli Equivalents/liter (mEq/L), or in international units, 135-145 mill moles/liter (mmol/L). The normal blood potassium level is 3.5-5.0 milli Equivalents/liter (mEq/L), or in international units, 3.5-5.0 milli moles/liter (mmol/L).The normal serum range for chloride is 98-108 mmol/L.

RESULTS

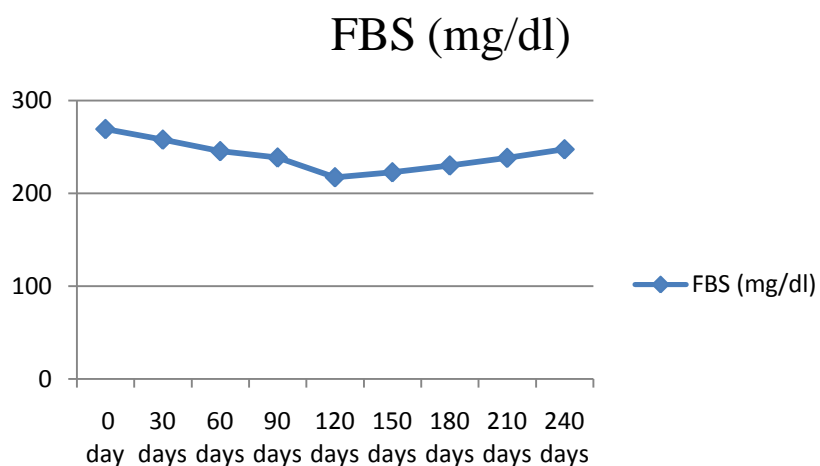**Body Mass Index & Blood Pressure Rutin Supplementation Tablets and withdrawal of Rutin Supplementation Tablets:**

Parameters	0day (Baseline)	60 days	120 days	180 days	240 days
BMI (Kg/m^2)	24.8±1.5	24.2±1.2	24.0±1.4	24.4±1.6	24.6±1.2
Systolic Blood Pressure(mmHg)	130.2 ±6.5	128.5±5.5	126.4±4.5	127.8±5.2	128.7±6.2
Diastolic Blood Pressure(mmHg)	85.1±5.2	84.3±5.0	83.7±4.4	84.4±2.5	83.3±5.2

The inclusion criteria for diabetic patients were [mean ± standard deviation (SD)]

It can be conferred from the above table that the Systolic, diastolic and body mass index had shown a tendency of decrease with rutin supplementation and withdrawal of rutin supplementation had brought back the level to the nearest of baseline and weight too had attenuated to some extent.

Fasting Blood Sugar Level on Rutin Supplementation Tablets and after withdrawal of Rutin Supplementation Tablets:

| Days	0day (Baseline)	30 days	60 days	90 days	120 days	150 days	180 days	210 days	240 days
FBS(mg/dl)	269.25	257.8	245.4	238.5	217.2	222.6	229.9	238.1	247.4

FBS (mg/dl)

It can be conferred from above figure that Rutin Supplementation helps in lowering blood sugar level in diabetic patients and blood sugar level increased with the stoppage of Rutin Supplementation.

HbA1C, Serum urea, Serum Creatinine, Serum electrolytes on Rutin Supplementation Tablets and after withdrawal of Rutin Supplementation Tablets :-

| Parameter	0day (Baseline)	60 days	120 days	180 days	240 days
HbA1C	9.6	9.2	8.2	8.5	9.1
Serum urea(mg/dl)	28.2	26.8	25.4	25.8	26.6
Serum Creatinine(mg/dl)	0.87	0.82	0.78	0.79	0.82
Serum electrolytes (mmol/l)					
Na++	138.2	136.6	134.4	135.2	136.6
K+	4.5	4.2	3.9	4.1	4.2
Cl-	101.3	102.5	103.4	102.7	101.8

HbA1C
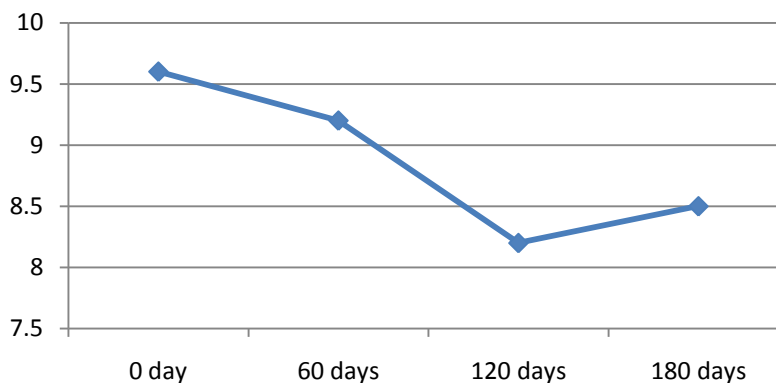
The above graph shows that rutin supplementation decreased the glycated hemoglobin level in diabetic patients.

TC, TGL, HDL, LDL & VLDL at Baseline, on Rutin Supplementation Tablets and after withdrawal of Rutin Supplementation Tablets:-

Lipid profile	0day (Baseline)	60 days	120 days	180 days	240 days
Tc (mg/dl)	142.7	146.3	149.8	152.6	150.8
Tgl (mg/dl)	132.8	168.5	191.3	194.2	188.6
Hdl (mg/dl)	37.4	42.7	47.8	46.3	45.2
Ldl (mg/dl)	78.74	69.99	63.74	67.44	67.88
Vldl (mg/dl)	26.56	33.7	38.26	38.84	37.72

LIPID PROFILE
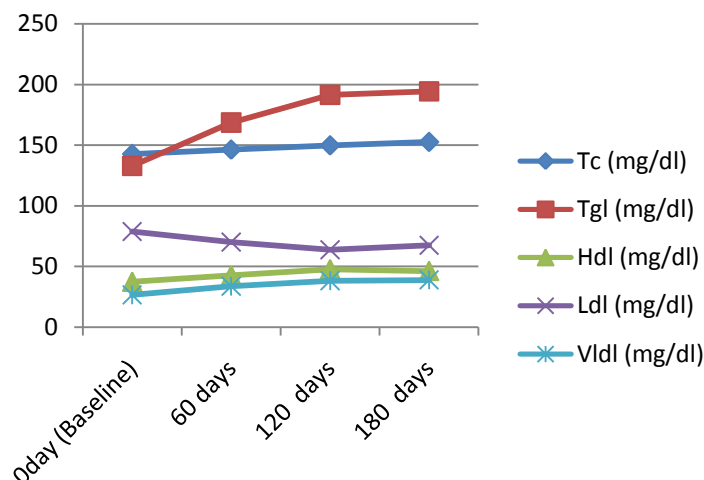
It can be conferred from the above figure that TC, TGL, HDL & VLDL had shown an increasing tendency with rutin supplementation whereas LDL has decreased.

CONCLUSION

We conducted a randomized and administered dose study to investigate the efficacy of rutin supplementation in patients with type-II diabetes mellitus. Patients received rutin supplementation tablets of 500 mg for 120 days and results were noted within every 60 days. The treatment period was 240 days. Oral administration of rutin supplementation tablets significantly decreased the levels of Fasting Blood Sugar Level (FBS), glycated hemoglobin (HbA1C) and LDL cholesterol. Rutin administration in animals had shown a declining tendency of TGL and LDL and the HDL had increased significantly. But the same administration of rutin in human beings is somehow different regarding TGL as it had shown an increasing pattern in most of the patients.

In conclusion, rutin is a dietary supplement that helps to remain healthy in a number of ways. Rutin is a good choice as a general supplement which reduces Blood Sugar Level, Glycated hemoglobin and LDL and increases the HDL. The levels of serum urea and serum Creatinine has been lowered resulting in proper functioning of kidney and liver. The only drawback is regarding TGL which goes on increasing with rutin supplementation [1-18].

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