شبكة المعلومات الجامعية

التوثيق الإلكتروني والميكروفيلم

بسم الله الرحمن الرحيم

HANAA ALY

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جامعة عين شمس

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قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأقراص المدمجة قد أعدت دون أية تغيرات

يجب أن

تحفظ هذه الأقراص المدمجة بعيدا عن الغبار

HANAA ALY

Evaluation of the impact of Rutin and Vitamin C combination on Oxidative stress, insulin sensitivity and lipid profile in type 2 diabetic patients

A Thesis

Submitted for Fulfillment of the Requirements for the

Philosophy degree
In Pharmaceutical Sciences

(Clinical Pharmacy)

By

Sara Ramzy Ragheb

Master of Pharmaceutical sciences , 2015

Assistant Lecturer of Clinical Pharmacy
Faculty of Pharmacy
Ain Shams University

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Sara Ramzy Ragheb

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List of Abbreviations

2-h PG	**2-h Plasma Glucose**
AA	**Ascorbic Acid**
ACCP	**American College of Clinical Pharmacy**
AD	**Alzheimer's disease**
ALT	**Alanine Transaminase**
AST	**Aspartate Aminotransferase**
BMI	**Body Mass Index**
CAT	**Catalase**
DPP-4 inhibitors	**Dipeptidyl Peptidase-4 inhibitor**
FBG	**Fasting Blood Glucose**
FI	**Fasting Insulin**
GDM	**Gestational Diabetes Mellitus**
GIP	**Glucose-dependent Insulinotropic Peptide**
GLP-1	**Glucagon Like Peptide 1 Receptor**
GPx	**Glutathione Peroxidase**
H_2O_2	**Hydrogen Peroxide**
HbA1c	**Glycated Hemoglobin**
HDL-C	**High-Density Lipoprotein Cholesterol**
HOMA-IR	**Homeostasis Model Assessment of Insulin Resistance**
IDF	**International Diabetes Federation**
LDL-c	**Low Density Lipoprotien-cholesterol**

LOOH	**Lipid hydroperoxide**
MDA	**Malondialdehyde**
MENA	**Middle East and North Africa**
MODY	**Maturity-Onset Diabetes of the Young**
OGTT	**Oral Glucose Tolerance Test**
OS	**Oxidative Stress**
QOL	**Quality Of Life**
RNS	**Reactive Nitrogen Species**
RONS	**Reactive Oxygen and Nitrogen Species**
ROS	**Reactive Oxygen Species**
RS	**Reactive Species**
SF-36	**Short Form 36 questionnaire**
SGLT2	**Sodium-Glucose Transport Protein 2**
SOD	**Superoxide Dismutase**
STZ	**Streptozotocin**
T2DM	**Type 2 Diabetes Mellitus**
TC	**Total Cholesterol**
TG	**Triglycerides**

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Abstract

Abstract

Aim: The objective of this study was to examine the impact of vitamin C on glycemic control, insulin resistance, lipid profile, and oxidative stress markers alone and in combination with Rutin in patients with type 2 diabetes.

Methods: A prospective, randomized, controlled study carried out on 53 patients with type 2 diabetes randomized into 3 groups ;(group A) 20 patients received rutin and vitamin C, (group B) 20 patients received vitamin C and (group C) 13 patients received antidiabetic medications only. Fasting Blood Glucose (FBG), Glycated Hemoglobin (HbA1c), fasting insulin, Malondialdehyde, Superoxide dismutase, Lipid profile and patients' quality of life (QOL) using SF-36 questionnaire were assessed at baseline and after 8 weeks in all patients.

Results: At baseline, there was no significant difference between 3 groups , only FBG level was lower in group C versus group A and B (p=0.0021). After 2 months , a significant decrease was observed in the % change of FBG in groups A and B versus group C(p=0.0165, 0.0388 respectively).Low Density Lipoprotien-cholesterol (LDL-c) and Total cholesterol (TC) levels improved significantly in group B relative to baseline (p = 0.0239 ,0.0166 respectively).In group A versus group C, QOL, physical functioning and power domains improved significantly (p=0.0049, 0.0253 respectively).While Limiting the role of physical and emotional health considerably improved in group B versus group C (p=0.0267,0.0280 respectively).

Conclusion: Vitamin C supplementation alone or with Rutin improved glucose control relative to controls, but did not directly affect HbA1c, TC, HOMA-IR or oxidative stress in T2DM patients.

Introduction

Introduction

Diabetes mellitus is one of the most common and complex problems of modern societies which has caused many economic and social problems. Type 2 diabetes mellitus (T2DM) is a very complex and multifactorial metabolic disease characterized by insulin resistance and β cell failure leading to elevated blood glucose levels. Chronic elevation of blood glucose is a central factor in the production of reactive species (RS) that, in turn, promote cellular damage and contribute to the development and progression of diabetic complications. In order to encounter the deleterious effects of such species, the body has several endogenous antioxidant systems or can obtain exogenous antioxidants from diet that neutralizes such species and keeps the body homeostasis. An imbalance between the RS generation and the antioxidants leads to the occurrence of a condition known as "oxidative stress" that result in the development or progression of pathological conditions among which one is diabetes.

Rutin is a glycoside that belongs to the flavonoid group, and widely exists in medicinal herbs, vegetables, fruits, beverages, and plant-derived dietary sources. Rutin exhibits multiple pharmacological activities including antidiabetic , antioxidant and anti-inflammatory in different models of rodents. It has been shown that rutin, by its ability to scavenge free radicals and to inhibit lipid peroxidation, prevents streptozotocin (STZ)-induced oxidative damage and protects pancreatic β cells to increase insulin secretion and decrease blood glucose levels. Also, Vitamin C or Ascorbic acid (AA) is a water-soluble antioxidant that scavenges reactive oxygen and nitrogen species (RONS) and reduces oxidative stress in vitro and in vivo .Rutin also seems to stabilize vitamin C. If Rutin is taken together with vitamin C, the activity of ascorbic will be intensified. It helps certain vitamins (e.g. Vitamin C) to perform better.