

STUDY OF THERAPEUTIC EFFECT OF BLACK SEED OIL ON HYPERLIPOPROTEINEMIA

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Abstract

Hyperlipoproteinemia is well established as a major risk factor for cardiovascular diseases . Lowering of serum lipids were found to be associated with the reduction in cardiovascular diseases .The aim of this study is to determine the effect of Nigella sativa oil on the serum lipids , Fasting blood glucose and uric acid in Hyperlipoproteinemia patients. Blood samples were taken from (30) patients suffer from Hyperlipoproteinemia and volunteered to take Nigella sativa oil .The blood samples from these groups were analyzed for measuring serum total cholesterol triglycerides , phospholipids ,low density lipoprotein,fasting blood glucose and uric acid before and after taking Nigella sativa oil .The results revealed that Nigella sativa oil was shown to decrease significantly the levels of total cholesterol , triglycerides, phospholipids , LDL cholesterol and uric acid while there were no effects on VLDL –cholesterol and fasting blood glucose , it was also shown significant increase in the levels of HDL- cholesterol.

دراسة تأثير زيت الحبة السوداء على فرط الدهون

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المستخلص

هناك علاقة معروفة بين فرط الدهون وامراض القلب . ان انخفاض الدهون يؤدي الى خفض حالات امراض القلب . في هذا البحث تمت دراسة تأثير زيت الحبة السوداء على مستوى الدهون ، سكر الجلوكوز وحمض اليوريك في دم مرض فرط الدهون . تم اخذ عينات دم من (30) مريض بمرض فرط الدهون لآخذ زيت الحبة السوداء وتحليل عينات الدم لمعرفة مستويات الكولسترول والجليسيريدات الثلاثية والدهون المفسفرة والدهون منخفضة الكثافة والعالية الكثافة ومستوى سكر الدم بعد الصيام وحمض اليوريك قبل وبعد تناولهم لزيت الحبة السوداء اوضحت النتائج ان زيت الحبة السوداء خفض بشكل كبير كل من مستويات الكولسترول والجليسيريدات الثلاثية والدهون المفسفرة وكولسترول الدهون واطنة الكثافة وحمض اليوريك وليس له تأثير على كولسترول الدهون واطنة الكثافة جدا وكذلك سكر الدم كذلك زيادة ملحوظة جدا في كولسترول الدهون عالية الكثافة.

Introduction

The term hyperlipoproteinemia are traditionally defined as conditions in which, concentration of cholesterol- or triglyceride-carrying lipoproteins in the blood plasma above normal limit [1]. Hyperlipoproteinemia may occur as primary conditions or secondary to other disorders. Primary hyperlipoproteinemia are caused either by genetic abnormality or due to the interaction of diet with genetic factor [2]. Secondary hyperlipoproteinemias are referred as to abnormality of lipoprotein metabolism resulting from another condition [3]. These conditions included about (50 %) of patients with uncontrolled diabetes mellitus, hypothyroidism, alcoholism, chronic renal failure, gout, chronic liver disease (especially cholestatic), and hypopituitarism develop hyperlipoproteinemia [4].

Recently there has been much interest in the significance of the lipoprotein in atherosclerosis. Large numbers of studies have been carried out, different populations have been examined, and various diets have been tried [5]. Interest in serum lipid concentrations in health and disease have been greatly stimulated since a close correlation was found between the raised fasting serum lipid concentrations and the prevalence of IHD [6]. *Nigella sativa* Linn (Black cummin) is a widely cultivated herb throughout several countries. Chemical analysis of *Nigella sativa* seeds showed a composition of (20.85%) proteins, (38.20%) fat, (4.64 %) moisture, (4.37%) ash, (7.94 %) crude fiber and (31.94 %) total carbohydrate [7]. Sodium, iron, zinc, calcium, magnesium, manganese and copper were detected in *Nigella Sativa* seeds at low levels, while lead,

cadmium and arsenic were not present. Prophet Mohammed (S||) stated in his "Al - Hadith Al - Sharif " that "the black cummin (black seeds) cures every illness except death". No wonder then that a little bottle of the oil was even found in tomb of the legendary Pharaoh Tutankhamon [8]. *Nigella sativa* exerted many pharmacological effects; these include: antibacterial, antifungal, bronchodilator, inhibition of histamine release from mast cells [9], anticholinergic and smooth muscle relaxant effects, cardiac depressant and hypotensive effects .

The aim of this study to undertaken to find out the rate of hyperlipoproteinemia and its clinical effect, with the therapeutic attempt to decreased plasma lipid by *Nigella saliva* seeds oil.

Patients and methods

The study group conducted on (30) patients suffered from hyperlipoproteinemia and volunteered to take *Nigella saliva* seeds oil. (1.2g as a capsules twice daily). Blood samples were obtained from patients with hyperlipoproteinemia after an overnight fasting. Blood samples were collected and analyzed for serum total cholesterol, triglyceride, HDL-Cholesterol, phospholipids, fasting blood glucose and uric acid by using enzymatic methods while LDL-Cholesterol and VLDL-Cholesterol can be estimated by the method described by Fredrickson et. al [10].

Results

The mean values of effect of *Nigella saliva* oil on serum lipids, fasting blood glucose and uric acid was shown in Table (1) and Figure (1). The table showed a significant decrease in the values of phospholipids and total

cholesterol ($p < 0.05$) in patient with hyperlipoproteinemia before taking the oil of *N. sativa* and after (3 weeks); While the remainder of data except HDL-cholesterol showed a decrease in the values but statistically not significant, and HDL-cholesterol showed a significant increase ($p < 0.05$). In the same table when comparing the levels of triglycerides and uric acid before taking the oil of *N. sativa* and after (6 weeks) a positive significant decrease ($P < 0.05$), while phospholipids and total cholesterol showed a decline ($P < 0.01$). In contrast the level of HDL-cholesterol which is significantly increased ($P < 0.005$) and there was no statistical difference in the values of VLDL-cholesterol and fasting blood glucose.

In the same table the levels of triglycerides, phospholipids, total cholesterol and uric acid when compared with before and after (9 weeks) taking *N. sativa* oil showed a significant decrease ($P < 0.05$), while the LDL-cholesterol showed a decline with ($P < 0.05$). In contrast, the other data except HDL-cholesterol showed insignificant changes while HDL-cholesterol revealed a significant increase ($P < 0.05$). The levels of triglycerides, phospholipids, total cholesterol and uric acid when compared with that *N. sativa* oil taken for (3 and 6 weeks) showed a significant decrease ($P < 0.05$) while the remainder of data except HDL-cholesterol showed a decrease in their values but statistically not significant.

The table also indicated that the levels of all data except VLDL-cholesterol, LDL-cholesterol, fasting blood glucose and HDL-cholesterol when compared between taking of *N. sativa* oil for (3 and 9 weeks) showed a significant decrease ($P < 0.05$). However, VLDL-cholesterol, LDL-cholesterol and fasting blood glucose showed a statistically

no significant change while HDL-cholesterol showed a significant increase ($P < 0.05$). It has also been found that the level of all data except HDL-cholesterol, VLDL-cholesterol and fasting blood glucose when compared between taking the *N. sativa* oil after (6 and 9 weeks) which showed a significant decrease ($P < 0.05$) and HDL-cholesterol observed a significant increase ($P < 0.05$). While in the values of VLDL-cholesterol and fasting blood glucose insignificant decrease.

Discussion

The aim of treating patients suffering from hyperlipidemia is to reduce the serum concentration of elevated atherogenic lipoprotein and triglycerides and to increase the concentration of antiatherogenic HDL. Because animal tissues can readily introduce double bonds at the (A^9) position of fatty acids but cannot introduce additional double bonds between the (A^9) double bond and the methyl-terminal end of the fatty acid chain. [11] Linoleic acid with double bonds at (A^9) and (A^{12}), and α -linoleic acid ($C18A^{9,12,15}$) cannot be synthesized by mammals. Because they are necessary precursors for synthesis of other products, these fatty acids are required in the diet and are obtained from plant sources. [12]. The reasons of the *N. sativa* in the lowering serum lipids may be to the that the oil of *N. sativa* L, contains the active ingredient; Thymoquinone [13], which has a cellular protective effect through the inhibition of the following: (1)-The leakage of cytotoxic enzymes that indices the degree of cell membrane damage and another enzymes that index for the damage of mitochondria inside cells. (2)-The depletion of intracellular glutathione, which leads to loss of cell viability due to high susceptibility to irreversible injury by

oxidation intoxication and free radicals which, can result in lipid peroxidation, protein oxidation.(3)- The oil of *N.sativa* a high concentration of polyunsaturated fatty acids especially linoleic acid, because this oil when ingested the decrease concentration of serum lipids and this may due to decrease the distribution of serum lipids in adipose tissues and also lead to decrease BMI. Also linoleic acid was precursor for the synthesis of arachidonate which is usually derived from the 2-position of fatty phospholipids in the plasma membrane as a result of phospholipase A₂ activity is the substrate for the synthesis of PG₂, TX₂ and LT₄ compounds. Thromboxanes are synthesized in platelets and upon release cause vasoconstriction and platelet aggregation while PGI₂ are produced by blood vessel walls and are potent inhibitors of platelet aggregations. [14]

The reason for cholesterol- lowering effect of polyunsaturated fatty acids is still not clear. However, several hypotheses have been advanced. In 1970 Grundy and Ahrens [15] found in their studies various mechanisms that might explain the hypocholesterolemic effects of polyunsaturated fats. The action of polyunsaturated fat could result from (1) an increase in fecal excretion of neutral steroids and/or bile acids, (2) a reduction in cholesterol absorption in the small intestinal, (3) a decrease in endogenous cholesterol synthesis, and (4) a redistribution of circulating cholesterol between the plasma and tissues pool.

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