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Effects of Monacolin K of Red Rice and Glucomannan, Combined with a Low Calorie Diet, in Treatment of Dyslipidemia and Hypertension

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Abstract

Alarming increase in incidence of cardiovascular disease is result of a nutrition pattern characterized by an increase in consumption of fats, cholesterol, sugar and other refined carbohydrates, concomitant with low consumption of polyunsaturated fatty acids and fibers. The purpose of this study was to evaluate the efficacy of the monacolin K of red rice and glucomannan, associated with low-calorie diet, on improvement of lipid profile and hypertension, symptoms of metabolic syndrome. In 180 Neapolitan patients with metabolic syndrome, we evaluated effects of monacolin K of red rice and glucomannan, associated with a low-calorie diet, on total cholesterol (CT), LDL cholesterol (LDL), HDL cholesterol (HDL), triglycerides (TG) and blood pressure (BP). The results showed a significant decrease in average value of CT (-20%), LDL (-25%), TG (-20%), with an increase in HDL (+15%) and a decrease in BP (-20%). These findings corroborate evidences showing a therapeutic effects of these nutraceuticals in the treatment of dyslipidemia and hypertension, when a low-calorie diet alone is ineffective.

Keywords: Hypertension; Dyslipidemia; Cholesterol; Blood pressure

Introduction

Metabolic syndrome is a medical condition deserving of special attention because of its prevalence and impact [1]. This term does not indicate a single disease, but a group of predisposing factors which, joined together, place the subject in a band of high risk for diseases such as diabetes, cardiovascular problems and hepatic steatosis [2-5].

Numerous epidemiological and experimental studies have demonstrated that metabolic syndrome affects almost half of adults over 50-60 years [4,6-12]. Probably, this incidence will grow in the future, considering spreading childhood obesity. An excess of body fat, especially when it is localized in the abdominal region, leads to an imbalance of the metabolism of fats and sugars that induces hyperinsulinemia (high insulin level in the blood, an indicator of increased resistance to this hormone) [9,13]. In addition to strategies based on changing lifestyle, it is frequent utilization of natural substances, with beneficial properties [14-18]. Monacolin K of red rice (10 mg, 90% by policosanol) is able to inhibit the HMG-CoA reductase, which is a key enzyme in the biosynthesis of cholesterol. Glucomannan (3 g per day) is particularly useful in the reduction of body weight and cholesterol [19]. It is also useful in constipation to regulate bowel function alternately in irritable bowel syndrome. The use of these products called "nutraceuticals" would appear useful in patients with poor tolerance to traditional drugs or those who reject traditional drugs [20-23]. The purpose of the study was to evaluate efficacy of the monacolin K of red rice and glucomannan, associated with low-calorie diet, on improvement of lipid profile and hypertension, symptoms of metabolic syndrome.

Materials and Methods

180 subjects (83 females and 97 males) with mild to moderate hypercholesterolemia, (range of total cholesterol between 200 and 290 mg/dl), mild hypertension (no antihypertensive drug therapy; 140-159/90-99 mm Hg systolic/diastolic blood pressure), in which low-fat diet for three months did not achieve the treatment goal, were treated also with monacolin K of red rice (10 mg, 90% in policosanol per day) and fiber glucomannan (3 g per day) for 24 weeks. Blood pressure (BP), lipid profile [total cholesterol (CT), LDL cholesterol (LDL), HDL cholesterol (HDL), triglycerides (TG)], biochemical parameters related to tolerability (GOT, GPT, CPK) and body mass index were determined at baseline (T0), to 12th week (T1) and 24th week (T2). All biochemical parameters were performed by a single laboratory accredited to ISO parameters accuracy. All subjects expressed informed consent. The data were expressed as mean ± standard deviation (M ± DS) and percentage (%) values. Significance of differences between groups was determined by Student's test for paired data, for linear data and the X2 for nonparametric data (Table 1).

Results

The results are reported in table. Monacolin K of red rice and fiber glucomannan, associated with a low-calorie diet, for 24 weeks showed a reduction in CT, LDL and systolic-diastolic BP. At T1 COL was reduced by 12.8% in males and 13% females, LDL was reduced by 15% in males and 16.2% females. HDL was increased by 6.1% in males and 6.6% females, TG were reduced by 14.9% in males and 13% females. BP was decreased by 20% for both diastolic and systolic values. At T2 COL was reduced by 19.3% in males and 19.5% in females, LDL was reduced by 25.2% in males and 27% females; HDL was increased by 11.2% in males and 15.4% females. TG were reduced by 22% in males and 21% females. Body weight decreased in association to decrease in lipid parameters.

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	Basal	12th week		24th week		Statistical significance
	M ± DS	M ± DS	D % vs Basale	M ± DS	D % vs Basale	p
Total cholesterol (mg/dl)	262 ± 35	228 ± 32	-12.7	213 ± 27	-19.5	≥ 0.01
LDL cholesterol (mg/dl)	179 ± 29	149 ± 28	-15.6	135 ± 24	-25.9	≥ 0.01
HDL cholesterol (mg/dl)	52 ± 12	54 ± 14	6.7	55 ± 13	13.4	n.s
Triglycerides (mg/dl)	175 ± 13	135 ± 46	-14	136 ± 35	- 20.2	n.s
Systolic blood pressure (mmHg)	150 ± 9	141 ± 10	-9	117 ± 5	-33	≥ 0.01
Diastolic blood pressure (mmHg)	94 ± 4	87 ± 5	-7	77 ± 6	-17	≥ 0.01
Body mass index	28.1 ± 2.2	26.1 ± 2.5	-6.4	24.9 ± 2.3	-11,3	≥ 0.01

Table 1: Average values (SD) at baseline at 12th week and 24th week in 180 patients.

Discussion

High COL is one of many factors that predispose to cardiovascular diseases. Some of these factors are modifiable (smoking cigarette, blood pressure, diabetes mellitus), while others are called non-modifiable (age, sex, family history and genetic factors). The influence of diet on COL is on average equal to 15%, although significant modifications of the contribution dietary can cause variations up to a ± 30%. Possible failure of the diet requires use of lipid-lowering agents. Medicines used in presence of hypercholesterolemia are statins (HMG-CoA reductase) and fibrates (most useful in presence of high triglycerides).

An alternative strategy to classical pharmacological intervention is use of nutraceuticals with a good tolerability profile and activity on lipid profile [24]. A good effect on cholesterol synthesis is obtained by policosanol. These depress expression of HMG-CoA-reductase in concentration-dependent manner, probably by receptor-mediated mechanisms that inhibit transcription for this enzyme [25,26]. Some studies showed that policosanol induces other effects on cardiovascular risk, similar to pleiotropic effects attributed to statins [27]. Red rice to 5% in monacolin K is a natural substance that is used for thousands of years in China to achieve desirable values of cholesterol. Glucomannan is a polysaccharide with high molecular weight, is extracted from tuber of Amorphophallus konjac, a plant used in Japanese cuisine as an agent gelatificator. This fiber has the ability to attract a lot of water, increasing its volume up to 60-100 times and giving rise to a soft gelatinous mass. This feature gives glucomannan a dual effect: it reduces sense of hunger and absorption of fats and sugars, which are trapped in soft, viscous mass that forms in the intestine [27-34].

The present study showed that monacolin K of red rice and glucomannan is useful in therapy of dyslipidemia and hypertension, when a low-calorie diet alone is ineffective, and it confirm effectiveness of these nutraceuticals. Since low-fat diet alone for three months (before integration of monocolin K and glicomannan) did not achieve effects on metabolic parameters, the improvement in the lipid results could be attributed to a direct effect of monacolin K and glucomannan. In perspective, this experiment should be extended to younger subjects before appearance of metabolic syndrome. In this way, we could assess possible positive effects in prevention of metabolic syndrome.

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