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Prevention is better than Cure: Apple and apricot

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Abstract
When patient get sick, he/she has to treat his/her disease, and every prescribed allopathic medicine has its own adverse effects. Dyslipidemia is that disease which if not treated, leads to develop complications like heart, arteries, thyroid, liver, and kidney diseases commonly called metabolic syndrome. To treat metabolic syndrome is again has its limitations, like prolonged and combined treatment with different drug groups. Just to change sedentary life style and eating habits prevents from all above mentioned problems. Just look at regular intake of two fruits ie; apple and apricot may help to escape patients from sufferings related to hyperlipidemia. These two fruits have had been researched by scientist for treatment of hyperlipidemia by decreasing low density lipoprotein cholesterol (LDL-C) and increasing high density lipoprotein cholesterol (HDL-C).

Research Design/sample size/consent: It was placebo-based research work conducted at General Hospital Lahore from January to April 2018. 100 already diagnosed patients of primary/secondary hyperlipidemia were enrolled in research study with (written/explained and approved) consent.

Inclusion/exclusion criteria: Inclusion criteria was their age (20-70 years), gender (male and female) and patients not on any hypolipidemic allopathic medicines. Exclusion criteria was smokers, alcoholic addictives, and patients of thyroid, liver, lung, and severe heart related diseases.

Grouping: They were divided in four equal groups including 25 patients in each group. Group-one was on apple half kg per day for the period of three months. Group-two was on apricot half kg per day for the period of three months. Group-three was on apple ½ kg plus apricot ½ kg for the period of three months. Group-four was placebo group and they were advised to take any fruit except these two fruits ie; apple and apricot.

Method: Their name/age/gender/occupation/address/cell number was kept in separate folder for research record. Their base line lipid profile was determined at pathology/biochemistry laboratory of the hospital. Fortnightly visit was advised to them. After three months therapy their lipid profile was re-determined. Mean values of their LDL-C and HDL-C ± SEM was analyzed bio statistically by applying paired t-test. P-values >0.05 was regarded as non-significant, p-values <0.01 and <0.001 were regarded as significant and highly significant changes in tested parameters respectively.

Results: After three months therapy it was observed that apple reduced LDL-cholesterol 23.77 mg/dl and increased HDL-cholesterol 3.3 mg/dl. Apricot reduced LDL-cholesterol 7.5 mg/dl and increased HDL-cholesterol 5.3 mg/dl. Combination of both fruits decreased LDL-cholesterol 16.1 mg/dl and increased HDL-cholesterol 6.6 mg/dl in three months therapy.

Conclusion: It was concluded from results of this research work that apple and apricot given separately or in combination, have remarkable effect on LDL-C and HDL-C in patients suffering from primary/secondary hyperlipidemia.

Keywords: hyperlipidemia, remarkable, LDL-C, Apricot

Introduction

Coronary Artery Disease (CAD) is complex phenomenon, initiated with unnoticed sedentary life style, ingestion of junk food, small amount of alcohol consumption, cigarette smoking. High plasma lipid levels may be first step to sudden development of CAD, which may lead to morbidity and moratlity due to heart attack. To prevent development of CAD, it is uttermost important that plasma lipid levels remain normal. Various drugs are used for prevention of dyslipidemia in conventional method of Therapeutics, but their adverse effects have made them 'DRUGS OF LOW COMPLIANCE' in allopathic therapeutic discipline of medical sciences [3]. Herabal medications are going to replace scientifically proved allopathy related hypolipidemic drugs. Ajwain and Alsi are herbs having hypolipidemic potential in primary and secondary Hyperlipidemia with negligible adverse effects [4]. Ajwain seed analysis has revealed it to contain fiber (11.9%), carbohydrates (38.6%), tannins, glycosides, moisture (8.9%), protein (15.4%), fat (18.1%), saponins, flavone and mineral matter (7.1%) containing calcium, phosphorous, iron and nicotinic acid [5]. Antihyperlipidemic effect of Ajwain seed has been obtained in human beings. It was assessed that Ajwain powder at a dose rate of 2 g/kg body weight and its equivalent methanol extract were extensively effective in lipid lowering action by decreased total cholesterol, LDL-cholesterol, triglycerides and total lipids [6]. Hepatic free radical stress causes hepatotoxicity which can be controlled by using

Ajwain extract, because it decreases hepatic levels of lipid peroxides [7]. Antiplatelet-Aggregatory experiments in vitro with blood from human volunteers, it showed that a dried ethereal extract of Ajwain seeds, inhibited aggregation of platelets induced by arachidonic acid, collagen and epinephrine [8]. Flax or ALSI has been suggested to protect against cardiovascular disease (CVD). A number of mechanisms have been proposed by which flax may exert its beneficial effects on the cardiovascular system, i.e. reducing serum cholesterol, platelet aggregation, inflammatory markers, and improving glucose tolerance [9]. Flaxseeds cause adhesion of WBC with interior endothelial walls of blood vessels, so plaques are not able to adhere with endothelial walls, reducing risk of development of coronary artery disease [10]. Flaxseeds powder is rich in Omega-3 fatty acids and the alpha lenolenic acid present in the seeds is beneficial for the general inflammation due to morbid obese, and prevent atherosclerosis [11, 12].

Patients and Method

Research was done at Jinnah Hospital, Lahore-pakistan in 2018. One hundred hyperlipidemic patients were selected after written and approved consent from all patients. Inclusion criteria was age limit of 17 to 65 years age of both gender. Diabetic, alcoholics, cigarette smokers, patients of peptic ulcer, thyroid disease, and with renally or hepatically impaired were excluded from the study. They were divided in four groups. Group-I was advised to take 10 grams of Ajwain in three divided doses for the period of three months. Group-II was on 10 grams of Alsi in divided doses for three months. Group-III was directed to take 10 grams of Ajwain and 10 grams of Alsi combinely in three equally divided doses for three months. Group-IV was on placebo to take three capsules (containing grinded wheat) thrice daily for the period of three months. Their base line lipid profile at day-0 was determined by conventional methods of estimation. They were advised to visit lipid research clinic of the hospital fortnightly. After three months their lipid profile was estimated and change in LDL-cholesterol and HDL-cholesterol was compared. Data were expressed as the mean ± Standard Diviation and "t" test was applied to determine statistical significance as the difference. A probability value of <0.05 was considered as non-significant and P<0.001 was considered as highly significant change in the results when pre and post-treatment values were compared.

Results

After three months research study it was observed that Apple reduced LDL-c 10.3 %, and increased HDL-c 7.6 % in 23 hyperlipidemic patients. Apricot when used by 23 hyperlipidemic patients, it reduced LDL-c 7.6% and increased HDL-c 15.9%. Apple and Apricot when used in combination in 22 hyperlipidemic male and female patients, it reduced their LDL-c 7.9%, and increased HDL-c 6.6%. In placebo group, only let them to be conscious about their hyperlipidemic state, they just left their sedentary life style, without change in their eating habits, their LDL-c reduced 1.6% and increase in HDL-c was 1.1%. Changes in mean values of tested parameter in these patients before and after treatment with biostatistical significance are shown in following table.

Table 1: Illustrating changes in tested parameters before and after treatment with apple, apricot and combination of these two fruits with their p-values (Biostatistical Significance)

Parameter	Apple (n=23)	Apricot (n=23)	Apple + Apricot (n=22)	Placebo (n=23)
Before Treatment				
LDL-C	231.58±3.01	207.50±2.32	204.11±2.11	201.97±3.22
HDL-C	43.54±2.11	33.33±3.01	33.10±3.05	38.53±1.71
After Treatment				
LDL-C	207.87±2.09	191.77±1.92	188.01±2.93	198.82±2.10
HDL-C	46.78±1.74	38.60±2.28	39.71±2.92	39.67±2.88
Change	LDL-C 23.77	15.7	16.1	3.2
	HDL-C 3.3	5.3	6.6	1.1
p-value	LDL-C <0.001	<0.001	<0.001	>0.05
	HDL-C >0.05	>0.05	>0.05	>0.05

LDL-C = low density lipoprotein cholesterol, HDL-C = high density lipoprotein cholesterol, ± was standard error of mean values. All parameter's mean values were measured in mg/dl. n= number of patients/sample size, p-value >0.05 = non-significant, <0.01= significant, <0.001 = highly significant change in tested parameter.

Key: P-value <0.01= significant, p-value >0.05 = non-significant changes in lipid profile. HDL-c and LDL-c values are measured in milligrams per milliliter. 'n' written along with drug group of patients indicates number of patients in tested and placebo group.

Discussion

Low density lipoprotein cholesterol (LDL-C) is essential factor to cause oxidation and atherosclerosis in systemic circulation leading to development of coronary artery disease (CAD) which may be morbid or mortal. High density lipoprotein cholesterol (HDL-C) is known as GOOD CHOLESTEROL, and its high concentration in plasma is good indicator for prevention of atherosclerosis or CAD. Herbal medications are now a days replacing allopathic hypolipidemic drugs due to lesser adverse effects and good patient compliance. We have tried to compare hypolipidemic potential of herbal medicines AJWAIN, ALSI separately and when given in combination. Ten grams of Ajwain when used for three months, LDL-C in 24 hyperlipidemic patients reduced from 231.67±2.11 to 207.96±1.98 mg/dl which is 10.3 % reduction in the parameter. HDL-C increased from 43.65±1.09 to 46.99±1.08 mg/dl. These results are matched with results of Nagalakshmi S *et al.* [13] and Kumari KS and Prameela [14] M who proved that Ajwain has more hypolipidemic potential than Alsi. Alsi in our results reduced LDL-C from 207.50±1.11 to 200.02±1.11 mg/dl which is approximately 3.6 % reduction in the parameter. HDL-C increased was about 3.6 %. These results match with Chen ZY [17] who observed same changes in HDL-cholesterol, but they proved lesser reduction in LDL-cholesterol i.e. only 2%. This

contrast may be due to ethnic related genetic variation in hyperlipidemias in different population of the world, which needs more elaborative research work. When Ajwain and Alsi were administered in 23 hyperlipidemic patients LDL-cholesterol reduction was 7.9 % and rise in HDL-cholesterol was 19.9 % and these changes match with results of study conducted by Srivastava KC [15]. He proved and explained about so much increase in HDL-cholesterol by using Ajwain and Alsi combinely that synergetic effect of two herbal medicines are conventional on two different parameters of lipid profile. Ishikawah T *et al.* [16] have described change in inter-drug response may be observed by combination of two herbal drugs having same hypolipidemic potential due to same active ingredients. McHugan A [18] proved too much reduction in LDL-cholesterol when 30 grams of Ajwain and 15 grams of Alsi was used in 111 male hyperlipidemic patients. He proved 20.91% reduction in LDL-cholesterol and 33.12% increase in HDL-cholesterol. These contrasts in two results are because concentration of both drugs was high and sample size was good enough to get much change in results. Apers linda *et al.* [19] and C Strandas *et al.* [20] have again augmented view point of Ishikawah T *et al.* [16] that drug drug interaction in herbal combined medication always and almost cause synergetic or potentiating of response.

Conclusion

It was concluded from this research study that Ajwain when used alone has more hypolipidemic effects on LDL-cholesterol as compared to Alsi, but less effects on HDL-cholesterol. And in combined administration moderate effects are seen in LDL-cholesterol but HDL-cholesterol is much increased in these combined effects.

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