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AYURVEDIC HERBS IN THE MANAGEMENT OF CARDIOVASCULAR DISEASES- A CRITICAL REVIEW

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ABSTRACT

During last centuries, life style alteration has characterised by increased calories, fat intake & reduction in physical activities along with a dramatic increase in metabolic syndrome related disorder such as Diabetes, Dyslipidaemia, Hypertension, obesity and so on. Cardiovascular diseases (CVD) are the major cause of morbidity and mortality in our society with Dyslipidaemia contributing significantly to atherosclerosis.Thus there is an urgent need of knowing more about agent working on cardiac diseases. Apart from such agent of synthetic origin, there is an increasing search for cardiovascular diseases from natural origin. Various herbal drugs have been screened by different scientists on scientific parameters for evaluating their clinical efficacy in different cardio vascular diseases. A brief account of such studies has been reproduced in the paper.

KEYWORDS: Diabetes, Dyslipidaemia, Hypertension, obesity.

INTRODUCTION

The epidemic of cardiovascular disease (CVDs) is the most prevalent cause of death and disability in both developed as well as developing countries. Dyslipidaemia is closely linked to the pathophysiology of CVD and a key independent modifiable risk factor for cardiovascular disease. In India, there has been an alarming increase in the prevalence of CVD over the past two decades so much so that accounts for 24% of all deaths among adults aged 25–69 years. The World Health Organization estimates that Dyslipidaemia is associated

with more than half of global cases of ischemic heart disease and more than 4 million deaths per year. Dyslipidaemia is a disorder of lipoprotein metabolism, which can include over production or deficiency of lipoproteins or both. The disorder can manifest as an elevation of plasma cholesterol, Triglycerides, or both, or a low high density lipoprotein level or all three together that contributes to the development of atherosclerosis. Atherosclerosis is the narrowing of the coronary arteries due to plaque formation on artery wall and blood clots may develop on plaque surface, further blocking the blood supply to the myocardium(heart muscle)and resulting in myocardial infarction(heart attack),dyspnea (shortness of breath), stable angina, unstable angina may be present. Myocardial infarction may be a serious result of coronary artery disease. A complete blocked coronary artery causes death to a portion of the myocardium. Cardiac arrest may also result from coronary artery disease. 90% of sudden death occurs in patients with two or more major arteries narrowed by atherosclerosis. Currently available hypolipidemic drugs (statins) have been associated with a number of side effects. Patients on treatment with niacin showed significant elevation in ALT and risk of hepatotoxicity. Hence, there has been pursuit for safe and effective drug for dyslipidemia. Herbs have been used as a food and for medicinal purpose for centuries. Research interest has focused on various herbs that possess hypolipidemic effect that may be helpful adjunct in reducing the risks of cardiovascular diseases. Several drugs are proved experimentally and useful in the management of cardiovascular diseases. Keeping this point in the mind this critical review sited for the betterment of human population.

Aims and objectives

- To critically analyze the role of some herbs in the light of ancient as well as the present day knowledge for the prevention and management of cardiovascular diseases.

MATERIAL AND METHODS

All the references from the ayurvedic scriptures, modern medical books, researches and journals.

Observation and results

Arjuna

- The effect of bark powder of Terminalia arjuna, an indigenous drug, on anginal frequency, blood pressure, body mass index, blood sugar, cholesterol and HDL-cholesterol was studied in 15 stable (Group A) and 5 unstable (Group B) angina patients

before and 3 months after T. arjuna therapy. The drug lowered systolic blood pressure and body mass index to a significant level ($p < 0.05$) and increased HDL-cholesterol only slightly along with marginal improvement in left ventricular ejection fraction in stable angina patients. Results suggest that monotherapy with T. arjuna is fairly effective in patients with symptoms of stable angina pectoris.[1]

- One hundred and five successive patients with coronary heart disease (CHD) were recruited and using a Latin-square design divided into 3 groups of 35 each. The groups were matched for age, lifestyle and dietary variables, clinical diagnosis and drug treatment status. None of the patients was on lipid-lowering drugs. Supplemental vitamins were stopped for one month before study began and American Heart Association Step II dietary advice was given to all. At baseline, total cholesterol, triglycerides, HDL and LDL cholesterol and lipid peroxide estimated as thiobarbituric acid reactive substances (TBARS) were determined. Group I received placebo capsules; Group II vitamin E capsules 400 units/day; and Group III received finely pulverized T. arjuna tree bark-powder (500 mg) in capsules daily. Lipids and lipid peroxide levels were determined at 30 days follow-up. Response rate in various groups varied from 86% to 91%. No significant changes in total, HDL, LDL cholesterol and triglycerides levels were seen in Groups I and II (paired t-test $p > 0.05$). In Group III there was a significant decrease in total cholesterol (-9.7 +/- 12.7%), and LDL cholesterol (-15.8 +/- 25.6%) (paired t-test $p < 0.01$). Lipid peroxide levels decreased significantly in both the treatment groups ($p < 0.01$). This decrease was more in vitamin E group (-36.4 +/- 17.7%) as compared to the T. arjuna group (-29.3 +/- 18.9%). Terminalia arjuna tree bark powder has significant antioxidant action that is comparable to vitamin E. In addition, it also has a significant hypocholesterolaemic effect.[2]
- Terminalia arjuna bark extract, 500 mg 8 hourly, given to patients with stable angina with provocable ischemia on treadmill exercise, led to improvement in clinical and treadmill exercise parameters as compared to placebo therapy. These benefits were similar to those observed with isosorbide mononitrate (40 mg/day) therapy and the extract was well tolerated.[3]
- Effect of Terminalia arjuna on angina pectoris, congestive heart failure and left ventricular mass was studied in patients of myocardial infarction with angina and/or ischaemic cardiomyopathy. Bark stem powder of T. arjuna, 500 mg 8 hourly was administered to 10 patients of postmyocardial infarction angina and two patients of

ischaemic cardiomyopathy, in a dose of 500 mg 8 hourly postoperatively, for a period of three months (Group A). These patients were also on conventional treatment comprising of nitrates, aspirin and/or calcium channel blockers. Twelve age-, sex-, body mass index- and ECG-matched patients of postmyocardial infarction angina receiving only conventional treatment served as controls (Group B). Significant reduction in anginal frequency was noted in both groups. However, only Group A patients showed significant improvement in left ventricular ejection fraction (42.25 + 9.96 to 52.67 + 12.32% vs 51.83 + 5.99 to 49.83 + 2.52%) and reduction in left ventricular mass (159.18 + 51.11 to 127.47 + 52.40 gm/m2 vs 159.11 + 38.92 to 160.78 + 54.23 gm/m2) on echocardiography following three months of therapy. Both patients with ischaemic cardiomyopathy showed significant symptomatic relief in coronary heart failure from NYHA class III to NYHA class I. Prolonged administration of T. arjuna did not show any adverse effects on renal, hepatic and haematological parameters.[4]

Aamla

- The lipid lowering and antiatherosclerotic effects of Emblica officinalis (Amla) fresh juice were evaluated in cholesterol-fed rabbits (rendered hyperlipidaemic by atherogenic diet and cholesterol feeding). E. officinalis fresh juice was administered at a dose of 5 ml/kg body weight per rabbit per day for 60 days. Serum cholesterol, TG, phospholipid and LDL levels were lowered by 82%, 66%, 77% and 90%, respectively. Similarly, the tissue lipid levels showed a significant reduction following E. officinalis juice administration. Aortic plaques were regressed. E. officinalis juice treated rabbits excreted more cholesterol and phospholipids, suggesting that the mode of absorption was affected. E. officinalis juice is an effective hypolipidaemic agent and can be used as a pharmaceutical tool in hyperlipidaemic subjects.[5]
- Oral feeding of cholesterol resulted in a fivefold increase in total serum cholesterol of rabbits .Four months of amla treatment almost reversed the effect and the serum cholesterol level at the end of the treatment period was near normal. A similar effect was noted in the case of LDL cholesterol and TG levels. The extent of lipid changes between the two groups fed different doses of the extract was not significantly different, indicating that a dosage of 10 mg/kg body weight of extract was sufficient to reverse the hypercholesterolaemic condition in rabbits. *Amla* extract effectively prevent further extension of atheromatous plaques and promote reversal of already formed lesions.[6]

- Sixty type II hyperlipidemic patients of both sexes with plasma total cholesterol and low density lipoprotein level more than 240 mg% and 130 mg%, respectively, were selected for the trial. Out of total 60 selected patients, 40 were treated with Amla capsule (500 mg) daily for 42 days and 20 patients were given simvastatin capsule (20 mg) daily for 42 days. After the day of enrolment, all patients were followed up twice during the 42-day period. Blood samples were analyzed for various biochemical parameters and the values of Total Cholesterol (TC), Low Density Lipoprotein (LDL), High Density Lipoprotein (HDL), and Very Low Density Lipoprotein (VLDL) were measured before and after completion of the treatment with Amla and simvastatin. Cardiovascular parameters were recorded before and after completion of treatment. Treatment with Amla produced significant reduction of TC ($P<0.0001$), LDL ($P<0.0001$), triglyceride (TG) and VLDL ($P<0.0002$), and a significant increase in HDL levels ($P<0.0002$). Similarly, treatment with simvastatin produced significant reduction of TC ($P<0.0001$), LDL ($P<0.0009$), TG and VLDL ($P<0.017$), and a significant increase in HDL levels ($P<0.0001$). Both treatments produced significant reduction in blood pressure; however, this beneficial effect was more marked in patients receiving Amla.[7]

Guggulu

- On the basis of authentic references from the literature of ayurveda and on observations, Puskara-Guggulu, a combination of oleoresin of C. mukul and I-recemosa, has been clinically tried on a series of ECG proved 50 patients of ischaemic heart disease. This has been administered in the dose of 6 gms per day, in three divided doses upto a period of four months. Precordial pain, discomfort and dyspnoea on effort have been controlled. Mean Serum cholesterol has been found to be decreased by 17.47%. Apart from that, marked improved in the E. C. G. pattern in 30% cases has been recorded in terms of ST-segment and T wave changes, On the whole the result was cured 10% relieved 60%, improved 20% and unchanged 10%, offering a great hope for the prevention and cure of ischaemic heart disease.[8]

Gokshur

- 75 patients of either sex, different age groups having non-complicated, mild to moderate (140-179 mmHg. Systolic and 90- 109 mmHg. Diastolic) essential hypertension with the symptoms of headache, giddiness, insomnia was selected for the study. All the patients were randomly divided into three groups (A,B&C) having 25 in each. The test drug i.e

whole plant and fruits of Gokshura (Tribulus terrestris Linn) in the form of ghanasatwa (solid water extract) as administered orally to the Group A&B respectively, at the dose of 3 gm/day in three divided doses in a soft gelatin capsule and Group C was treated as control in which lactose IP was given with same dose, intervals etc, of the test drug. The duration of treatment was four weeks and the follow up of the patients was made at the end of every week. The results were observed on the basis of subjective and objective parameters before and after the therapy. The results of both subjective and objective parameters of the study reveals that both the whole plant and fruits of Gokshura (Tribulus terrestris Linn) in the form of ghanasatwa is having a significant action in reduction of clinical symptoms, systolic and diastolic blood pressure without any side effects on the patients of mild to moderate essential hypertension.[9]

- Coronary heart disease (CHD) was treated with saponin of Tribulus terrestris. According to 406 cases of clinical observation and a cross test (67 cases treated with Yufen Ningxin Pian as control), the results showed that the total efficacious rate of remission angina pectoris was 82.3%. It was higher than the control group with a total effective rate of 67.2% (P less than 0.05). The total effective rate of ECG improvement (52.7%) was even higher than that of the control group (35.8%). It is shown that saponin of Tribulus terrestris has the action of dilating coronary artery and improving coronary circulation, and thus has better effects on improving ECG of myocardial ischemia. If taken for a long time, it has no adverse reaction on blood system and hepatic and renal functions. Neither does it have side effects. It is one of the ideal medicines to treat angina pectoris.[10]

Puskarmoola

- Inula racemosa root powder was investigated in patients with proven ischaemic heart disease. The powder prevented ST-segment depression and T-wave inversion as observed in the post-exercise electrocardiogram. The petroleum ether extract of roots lowered plasma insulin and glucose levels within 75 min of oral administration to albino rats and it significantly counteracted adrenaline-induced hyperglycaemia in rats. The extract further showed negative inotropic and negative chronotropic effects on frog heart. All these findings indicate that one of the constituents of Inula racemosa may have adrenergic beta-blocking activity.[11]
- Beneficial effect of Inula racemosa (pushkarmoola) in angina pectoris: a preliminary report.[12]

Flaxseed

- The aim of this study was to evaluate the effects of prolonged supplementation with flaxseed flour as preventive therapy on cardiovascular risk parameters in healthy Wistar rats. The body weight, visceral fat mass, cholesterol, triglycerides, HDL, VLDL, glucose and thickness of the aorta values were statistically lower when compared to control group.[13]
- The antihypertensive effect was achieved selectively in hypertensive patients. In summary, flaxseed induced one of the most potent antihypertensive effects achieved by a dietary intervention.[14]

Garlic

- Findings suggest that oxygen free radicals are involved in the genesis and maintenance of hypercholesterolemic atherosclerosis and that use of garlic can be useful in preventing the development of hypercholesterolemic atherosclerosis.[15]
- A double-blind crossover study comparing the effect of aged garlic extract with a placebo on blood lipids was performed in a group of 41 moderately hypercholesterolemic men [cholesterol concentrations 5.7-7.5 mmol/L (220-290 mg/dL)]. After a 4-wk baseline period, during which the subjects were advised to adhere to a National Cholesterol Education Program Step I diet, they were started on 7.2 g aged garlic extract per day or an equivalent amount of placebo as a dietary supplement for a period of 6 month, then switched to the other supplement for an additional 4 month. Blood lipids, blood counts, thyroid and liver function measures, body weight, and blood pressure were followed over the entire study period. The major findings were a maximal reduction in total serum cholesterol of 6.1% or 7.0% in comparison with the average concentration during the placebo administration or baseline evaluation period, respectively. Low-density-lipoprotein cholesterol was also decreased by aged garlic extract, 4% when compared with average baseline values and 4.6% in comparison with placebo period concentrations. In addition, there was a 5.5% decrease in systolic blood pressure and a modest reduction of diastolic blood pressure in response to aged garlic extract.[16]

Ginger (Adraka)

- There was a significant reduce in triglyceride, cholesterol, low density lipoprotein (LDL), very low density lipoprotein (VLDL), levels of before and after study separately in each

group ($p<0.05$). The results show that ginger has a significant lipid lowering effect compared to placebo.[17]

CONCLUSION

Cardiovascular diseases, is greatly influenced by behavioural factors like diet and lifestyle. Appropriate dietary habits, adoption of regular exercise practice, avoidance of too much of alcohol consumption all play key role in reversal of pathology. It will have profound beneficiary effects in preventing and controlling cardiovascular diseases. There are many herbs having antihypertensive, antiatherosclerotic, cardioprotective and anxiotytic property and these can be used along with the standard management to minimize morbidity and mortality of heart disease. The knowledge about drugs is a prime factor in successful practice. Then it becomes easy to select the appropriate drug for that patient and that condition. So to review the available data is important. Some drugs are proved experimentally but numerous are yet to be revealed.

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