ABSTRACT

Introduction: Non communicable diseases (NCDs) are a major health problem in the world. Among these cardiovascular diseases (CVD) are the most important cause of morbidity and mortality. The etiology of CVD is multifactorial and there are many traditional and non-traditional risk factors that are associated with cardiovascular disease. Indians have high incidence of cardiovascular disease which cannot be explained by common risk factors. There are very few studies which assessed the correlation of traditional risk factors with newer non-traditional risk factors. In India there are many type of medical practices like Ayurveda, Homeopathic, Unani etc, all have their own logic and science. However, ayurvedic science in thought to be oldest and had originated in India. Ayurvedic principles like vata, pitta and kapha may be checked to estimate risk factors for CVD. Clinical findings based upon ayurvedic system of vata, pitta and kapha would be useful in conjunction with other biochemical and routine investigations. This kind of integrated approach would certainly lead to identification of more modifiable risk factors. There is an urgent need to integrate various medical practices to cope up this problem. It would help in early diagnosis, precautionary management and appropriate therapy in early stages.

With this background we planned a study among subjects with known coronary artery disease (CAD) to evaluate traditional and non traditional risk factors like insulin resistance, inflammatory markers, micronutrients (magnesium, vitamin B12, and folic acid), homocysteine, and dietary factors; and their interrelationship and association with “Prakriti” types described in ayurveda system of medicine.

Material and Methods: Three hundred patients who had CAD on angiography were included in this study consecutively. All patients were evaluated by complete history, physical examination, anthropometry and cardiovascular risk factors, dietary history, prakriti evaluation (ayurvedic) and blood samples were collected for biochemical, hormonal (insulin), nutritional [magnesium, vitamin B12, folate and homocysteine (Hcy)] and inflammatory markers [high sensitivity C-reactive protein (hsCRP), interleukin-6 (IL-6) and tumor necrosis factor-alpha (TNF-α)].

Results: In this study three hundred patients (M:216; F:84, mean age: 60.9±12.4 years, range 25-92 years) of known CAD were studied. Among traditional risk factors there
male preponderance, 78.4% were overweight or obese, 68.3% had hypertension (HTN), 58.7% had dyslipidemia and 41.6% had diabetes mellitus (DM). About 5% patients had no traditional modifiable risk factors.

Percentage of vitamin B12 and folate deficiency was 86.7% and 2.7% respectively. Hyperhomocysteinemia was present in 95.3% patients. Vitamin B12 levels were significantly lower and Hcy levels were significantly higher in subjects with dyslipidemia, DM and/or HTN. Serum vitamin B12 was inversely associated with triglyceride, very low density lipoprotein (VLDL) and positively with high density lipoprotein (HDL). Hcy was positively associated with triglyceride, VLDL and negatively with HDL. Vitamin B12 was inversely correlated with inflammatory markers (hsCRP and IL-6) directly related to insulin resistance whereas Hcy showed opposite pattern. Diabetes, dyslipidemia and hypertension were negatively correlated with serum magnesium levels; which were maintained even after adjustment with age, sex, and anthropometric parameters in multiple regression analysis. Similar observations were observed in dietary magnesium intake except low density lipoprotein (LDL) and total cholesterol. Dietary magnesium was positively correlated with serum magnesium.

Patients with diabetes had significantly high levels of IL-6, hsCRP and TNF-α compared to non diabetic subjects. Insulin resistance (HOMA-IR) was twofold high in diabetic subjects. Diabetic patients had significantly lower protein and total dietary fiber intake as compared to non diabetics. Diabetic patients had lower intake of vitamin A, riboflavin and vitamin B12. There was significantly lower intake of minerals by diabetic patients. Dietary carbohydrate and fat were positively, and protein and dietary fiber intake were negatively correlated with HOMA-IR and IL-6. There was no correlation of individual amino acids with HOMA-IR but showed strong negative correlation with inflammatory markers (hsCRP, IL-6 and TNF-α). Intake of vitamins and minerals were negatively correlated with HOMA-IR and inflammatory markers. There is a strong correlation between dietary factors, insulin resistance and inflammatory markers.

All inflammatory markers (hsCRP, IL-6, and TNF-α) were significantly higher and showed positive correlation in patients with dyslipidemia, diabetes mellitus and/or hypertension. TNF-α level showed a negative correlation with age and positive correlation with smoking. Only IL-6 and hsCRP had positive correlation with insulin resistance and
negative correlation with insulin secretion. Among lipid parameters, triglycerides had positive correlation, and HDL had negative correlation with all inflammatory markers. There was progressive increase in percentage of subjects with diabetes, hypertension and dyslipidemia with increasing levels of inflammatory markers.

Ayurvedic constitution types which were identified in this study were Kapha (K), Pitta Kapha (PK), Vata Kapha (VK) and Vata Pitta (VP). VK was more prevalent (62.3%) compared to others; K-5%, KP-15.7%, VP-17%. Triglyceride, VLDL and LDL was significantly higher and HDL cholesterol significantly lower in VK prakriti when compared with other constitution type. VK prakriti was correlated with diabetes mellitus (r=0.169, p=0.003, hypertension (r=0.211, p=<0.0001) and dyslipidemia (r=0.541, p=<0.0001). Inflammatory markers (IL6, TNF-α, hsCRP) and HOMA IR was highest in VK prakriti. Inflammatory markers were correlated positively with both VK and Kapha group.

Conclusions: In this study, most of the patients had traditional risk factors except 5% patients. Insulin resistance, nutritional factors and inflammatory markers were interrelated and showed positive association with traditional risk factors. Vatta-kapha and Kapha prakriti was positively correlated with traditional and non-traditional cardiovascular risk factors. Vitamin B12 deficiency, hypomagnesemia, and prakriti (ayurvedic approach) were identified as new cardiovascular risk factors in Indian patients with coronary artery disease. This kind of integrated approach would certainly help in early diagnosis, precautionary management and appropriate therapy in early stages.

“This is an attempt to link Clinical Biochemistry and Ayurveda in the management of Cardiovascular Disease. This integrated approach would certainly help in early diagnosis, preventive management and appropriate therapy.”