

Diabetes: Current Scenario and its Complication

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I am pleased to write this editorial article on the topic of current scenario of world's third largest disease known as Diabetes. It is a chronic metabolic disorder and syndrome in which glucose level raises in the blood (hyperglycemia) due to deficiency or diminished effectiveness of insulin with a strong hereditary basis. It is usually associated with passage of sugar in the urine and initially characterized by a loss of glucose homeostasis with disturbances of carbohydrate, fat and protein metabolism resulting due to defects in insulin secretion, insulin action or both. Diabetes is known to all as slow fatal disease but it is curable one with change in healthy lifestyle. So Diabetes mellitus (DM) is a common major public health problem of today's society in the world affecting millions of people. It is seventh in rank among the leading cause of death and third primarily because of the high rate of cardiovascular disease in people with diabetes. The prevalence of diabetes mellitus is increasing with ageing of the population and lifestyle changes associated with rapid urbanization and westernization due to increased consumption of high calorie and high fat diets and sedentary lifestyle. It is calculated that there are about 150 million people suffering with diabetes at present and this figure may rise to 300 million by 2025. The factors for this steep rise include genetic predisposition, urbanization, ethnicity, insulin resistance and central obesity. Presently, about 40-60% of subjects aged above 40 years in the world are suffering from diabetes mellitus and no fully effective cure is available for the disease. The majority of acute deaths due to insulin deficiency have been reduced due to insulin therapy from 1922, but later on various life threatening side effects have been illustrated. Type-I (insulin-dependent) diabetes, with early age onset, carries higher risk of heart attacks, stroke, nephropathy and peripheral vascular disease. Type-II (insulin non-dependent) diabetes mellitus and associated cardio-vascular diseases (CVD) have reached global epidemic proportions. Insulin resistance individual has commonly increased triglyceride concentrations and elevated total cholesterol concentrations, with increased concentrations of small dense LDL (Low density lipoprotein) and decreased concentrations of HDL (High Density Lipoprotein). The Type-I and Type-II diabetes contribute about 10% and 90% of diabetic population, respectively.

The chronic hyperglycemia of diabetes is associated with long-term damage, dysfunction and failure of various organs especially the eyes, kidneys, nerves, heart and blood vessels. Several pathogenic processes are involved in the development of diabetes. These range from autoimmune destruction of the β -cells of the pancreas with consequent insulin deficiency to abnormalities that result in resistance to insulin action. The basis of the abnormalities in carbohydrate, fat and protein metabolism in diabetes is deficient action of insulin on target tissues. Symptoms of marked hyperglycemia include polyuria, polydipsia, weight loss, sometimes with polyphagia and blurred vision. Impairment of growth and susceptibility to certain infections may also accompany chronic hyperglycemia. Acute, life-threatening consequences of diabetes are hyperglycemia with ketoacidosis or nonketotic hyperosmolar syndrome. Long-term complications of diabetes include retinopathy with potential loss of vision; nephropathy leading to renal failure; peripheral neuropathy with risk of foot ulcers, amputation and charcot joints and autonomic neuropathy causing gastrointestinal, genitourinary, cardiovascular symptoms and sexual dysfunction. Patients with diabetes have an increased incidence of atherosclerotic cardiovascular, peripheral vascular and cerebrovascular disease. Hypertension, abnormalities of lipoprotein metabolism and periodontal disease are often found in people with diabetes. The emotional, social impact of diabetes and the demands of therapy may cause significant psychosocial dysfunction in patients and their families. Diabetes and its complications are strongly associated with higher oxidative stress caused by reactive oxygen species (ROS) gen-

erated by sequential reduction of molecular oxygen. An excess of free radicals is detrimental to cell function including β -cells, endothelial cells, fat muscle and nerve cells. Hyperglycemia causes oxidative stress, which increases glycosylation and oxidation of proteins involved in the pathogenesis of the complications in diabetes. Moreover, oxidative stress contributes to impairment of β -cell function, insulin resistance, microvascular and macrovascular diseases. Lots of genes are also involved in insulin resistance and hyperglycemia like PTPN1 (Protein tyrosine phosphatase-N1, glycogen synthase (*gs*), phosphoenol pyruvate carboxykinase (*pepck*), glucose-6-phosphatase (*g6pase*), vascular endothelial growth factor (*vegf*), PPAR-G, KCNJ11, sterol response element binding protein-1c (*SREBP-1c*), *JAZF1* and hepatocyte nuclear factor 1- α (*HNF1*). Now a days, antidiabetic drug such as sulphonylureas like glimepiride act on the β -cells to increase insulin secretion. Other sulphonylureas like Biguanides (Metformin) inhibits gluconeogenesis, Thiazolidinediones act on peripheral tissues to decrease insulin resistance and Acarbose decreases intestinal glucose uptake (α -glucosidase inhibitors). As a consequence, diabetics are at significant risk of serious long-term complications such as cardiovascular diseases, blindness and kidney failure. The long term treatment of diabetes and its complications leads to enormous costs for society. Therefore, the development of new preventative and treatment strategies for diabetes would have an enormous impact with all types of medical treatments including allopathic, ayurvedic, homeopathic, sidha, unani, naturopathy and yoga. More than 200 pure phyto-chemicals are known to exert anti-hyperglycemic activity, some of these effects can be attribute to metabolic and hepatic toxicity. Diabetes is still not completely curable by the present anti-diabetic drugs. Mostly Insulin therapy is the only satisfactory approach in diabetes mellitus, even though it has several drawbacks like insulin resistance, anorexia, brain atrophy and fatty liver in chronic treatment. Present anti-diabetic drugs like glimepiride, glipizide, Pioglitazone, Rosiglitazone and metformin possess its side effects like gastro-intestinal disturbance, rarely thrombocytopenia, leucopenia, haemolytic anaemia, occasional allergic and the risk of hypoglycemia which leads to other complications. So, herbal drugs or combination of allopathic drugs with herbal drugs are gaining popularity in the effective safe treatment of diabetes mellitus. The stress free life style, healthy food, regular exercise, yoga and love with nature is the only solution to fight with diabetes instead of taking any drugs.

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