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EVALUATION OF ROLE OF STRESS AS AN ETIOLOGICAL FACTOR IN PATHOGENESIS OF TYPE 2 DIABETES MELLITUS

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ABSTRACT

Emotional stress leads to unhealthy life style behaviors i.e inadequate eating behavior, low exercise levels, smoking and alcohol abuse. All these are well known risk factors for type 2 Diabetes. The present study is designed to evaluate the role of stress as etiological factor in Type 2 Diabetes pathogenesis. Though chronic stress is not healthy for anyone but it is especially troublesome for diabetics because of additional glucose being continuously released into the blood stream which is in addition to taken from the food. So strategies to relieve chronic stress may pave a new avenue in the line of treatment of diabetes in addition to anti diabetic drugs.

KEYWORDS: Type 2 diabetes mellitus, stress, Madhumeha.

INTRODUCTION

Diabetes Mellitus (DM) is a chronic disease marked by elevated blood glucose level. It affects 5-6% of the global adult population. Type 2 diabetes prevalence is rising at alarming rates worldwide because of increased urbanization, high prevalence of obesity, sedentary lifestyles and stress, among other factors.

According to latest 2016 data from WHO, approx. 422 million people worldwide have Type 2 Diabetes mellitus.[1] Patients with Type 2 Diabetes not only have a chronic disease to cope with they are also at increased risk for coronary heart disease, peripheral vascular disease, retinopathy, nephropathy and neuropathy. The root cause of this increased prevalence can be traced out from every stage of life right from the childhood. The nurture of childhood has been changed now a days, botheration of home work, tuition, different types of classes and

the hectic atmosphere of competition make a child stressed and make it prone to many stress induced diseases including DM. The young generation due to busy schedule doesn't pay enough attention towards exercise. Increased working hours, target oriented jobs are making the lives of young generation distressful. Stress doesn't care about long term health unless we survive the immediate crisis. Repair can wait unless the crisis is over but people with less power, less money, less education, lower self esteem, less self confidence – the crisis never end. The socio-economical, emotional and physical threats are always there and lead to chronic stress due to which immune system get suppressed and body tends to break down to invite many diseases including DM. The poor is but obviously stressed for moving his life on but the strange is that wealthy persons are also not out from the catch of stress because they are worried to maintain their money and position. Thus, a person of today's era is like a passenger of a train named Stress which may drop him to any station like Diabetes, Hypertension, IHD, IBS etc.

Emotional stress leads to unhealthy life style behaviors i.e inadequate eating behavior in terms of quality and quantity of food, low exercise levels, smoking and alcohol abuse. All these are well known risk factors for type 2 Diabetes.

Acharya Charaka also mention such psychological factors like Udvega, Shoka, Abhighata etc. causative factors while describing nidana of vataja prameha and pittaja prameh, contributory factors include worries, tiredness and anger which are also some key signs of stress. People with stress often avoid their daily routine get depressed and show a sedentary lifestyle as mentioned in kaphaja prameh.[2]

The stress and tension over activate the sympathetic stimulation and promote the breakdown of triglyceride into glycerol and fatty acid and relies in blood causes rise of Free fatty acid in blood, FFA acts as insulin antagonist.[3] Though FFA is utilized instead of glucose, blood glucose level is increased. Moreover, stressors promote the secretion of glucagon while inhibits the secretion of insulin. It also increases the blood sugar because of excessive relieve of glucose by glycogen break down. So, we can easily understand the role of *Bahudrava Sleshma* (Growth hormone) responsible for lipolysis, increased *Abaddha Medas* (FFA) and how the *Manasikabhava* like *Chinta*, *Krodha* etc. adversely affect the etiopathogenesis of disease.

We can not gain our victory over genetic factors but of course, by diet control & by modifying our lifestyle we can definitely prevent or control this disease. And rather than spending too much money on the treatment that do not work, it is wise to spend enough on preventing the disease & managing health problems with nutrition & lifestyle intervention as life style change is safer than oral anti diabetic drugs.

DISCUSSION

The rising burden of Type 2 diabetes and other non communicable diseases which has occurred with modernization can be understood in the context of 'epidemiological transition'. Rapid socio monetary development and expansion have resulted in a life style shift from traditional to modern. In reality, higher fat diets and decreased physical activity have escorted the benefits of modernization in all populations. Exercise has been engineered out of our daily lives, both in the work place & leisure. These lifestyle changes when combined with increasing longevity form the basis of the dynamic Type 2 diabetes epidemic that we are witnessing today. The western lifestyle must have unmasked the effects of preexisting genes because the consistent result has been diabetes within a few decades. Patient gradually looses coping power towards day to day stressful events and generates the stress responses.[4] Emotions are registered and stored in the form of chemical messengers, which are nothing else but the complex molecules called neuropeptide found throughout the body. It communicates brain to brain message, brain to body message, body to body message and body to brain message. Individual cell including brain cells have receptor sites for the neuropeptides. They receive the exact combination of neuropeptides released during different emotional state. In the stress response such type of neuropeptides released and bind with cells and works as antagonism of insulin, leading to hyperglycemia.

Stress is a budding donor to create chronic hyperglycemia in diabetes. In fight or flight response Energy mobilization is a principal outcome. Stress stimulates the release of various hormones, which may lead to elevated blood glucose levels. Although this is of adaptive importance in a healthy organism, in diabetes, as a result of relative or absolute lack of insulin, stress-induced hyperglycemia cannot be metabolized properly. Furthermore, regulation of these stress hormones may be abnormal in diabetes. In contrast, more consistent evidence supports the role of stress in type II diabetes. Although large animal study supports the notion that stress reliably produces hyperglycemia in this form of the disease.

Furthermore, there is mounting evidence of autonomic contributions to the pathophysiology of this condition in both animals and humans.[5]

Stress comes from two main places: external sources, such as demanding jobs, problematic relationships and financial problems; and internal sources: how one perceives and responds to these and other events. When under stress, the body works overtime to cope up. One of the ways it does this is to release hormones, such as epinephrine and nor epinephrine, both which give added energy and concentration. But, in addition to the hormones, the body also releases glucose from liver, muscles and stored fat reserves. The stress that plagues most is chronic stress; which goes on for days and weeks. The "fight or flight" stress response occurs with chronic stress as in acute stress. The difference is that one keep it turned on perpetually for long periods of time because person feels an ongoing anxiety about the finances, jobs, health and for loved ones. Chronic stress is not healthy rather troublesome for people with diabetes because the person do not need the additional glucose being continually released into the bloodstream. This glucose is in addition to what being taken in from food.

Disturbed psychological factors negatively affect Hypothalamo-Hypophyseal axis[6] and stimulate adrenal cortex to release glucocorticoids hormones. As a consequence high levels of glucocorticoids during the stress, increases pathological glycogenolysis and protein catabolism, causes hyperglycemia. Furthermore it is also caused by glucocorticoids due to insulin inhibiting and high secreting glucagone effect. Impulses of stress are received by ANS, which are conveyed to its sympathetic neurons. That stimulates chromaffin cells to secrete epinephrine and norepinephrine, causing hyperglycemia by glycogenolysis and lipolysis.[7] The neurotransmitters catecholamines, epinephrine and norepinephrine increase with responding to stress and tension. Such neurotransmitters are bound with insulin receptor of cell and work as insulin antagonist[8], which lead to hyperglycemia in diabetic individual.

CONCLUSION

Chronic stress is found to be the etiological factor for type 2 diabetes. Though chronic stress is not healthy for anyone but it is especially troublesome for diabetics because of additional glucose being continuously released into the blood stream which is in addition to taken from the food. So strategies to relieve chronic stress may pave a new avenue in the line of treatment of diabetes in addition to anti diabetic drugs.

Ayurvedic way of stress management includes purificatory Panchkarma therapies, use of Rasayana ausadhis in the form of anti stress herbs, polyherbal and herbomineral compounds, adherence to right sociopersonal and behavioral conduct (achara rasayan), practice of yoga and beneficial diets(pathyahara). Many herbs possess proven antistress and adaptogenic properties. Avoidance of causes of stress by Nidan parivarjana and by following swasthvritta and sadvritta described in ayurveda is very beneficial. physical exercise (releases endorphins that make you feel good), meditation, yoga nidra and avoidance of alcohol and cigarette consumption etc may prove beneficial.

Stress has a role in the onset of Diabetes and poor glycemic control affecting lifestyle. Interventions to manage stress in Diabetics can have an important positive effect on quality of life and glycemic control.[9]

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