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Critical Appraisal of Etiopathogenesis of Metabolic Syndrome as per *Satkriyakala* and its *Ayurvedic* Management

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ABSTRACT

The Metabolic Syndrome consists of a group of metabolic abnormalities that leads to increased risk of CVD and Diabetes Mellitus. Other names of metabolic syndrome are Syndrome X or Insulin Resistance syndrome. The criteria for the diagnosis of metabolic syndrome have taken from the original definition by the World Health Organization in 1998. According to this criteria the major features are **Centralobesity, Hypertriglyceridemia, Decreased High Density Lipoprotein (HDL), Hyperglycaemia** and **Hypertension**. In recent years, because of its complicated etiopathogenesis, the metabolic syndrome is gaining too much importance by the healthcare workers, physicians and researchers worldwide. The central obesity seems to be a key factor to develop metabolic syndrome. It is an important and major health hazard in the developed nations and gradually acquiring its place in developing world too. So it is the need of time to understand the disease processes on the basic principles of Ayurveda too so that the holistic approach can be taken for the managements of the disease for the benefit of mankind.

KEYWORDS

Metabolic Syndrome, Satkriyakala



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INTRODUCTION

The disease occurs more in middle aged populations of the world. In Australia¹ the prevalence of the disease in the adults ranges between 13.4 to 30.7%, where as in U.S.A² 22.8% for men and 22.6% for women. Similar situation is found in the Indian subcontinent where recent data has suggested that about one third to one fourth of the adult Indian population suffers from the Metabolic Syndrome. There are some communities which are more prone to type 2 DM and having symptoms of Metabolic Syndrome for example the Bhatia community of Punjab. In the adults and older from an urban population in Karachi city of Pakistan, the prevalence of Metabolic Syndrome was 35% and 50%, as per IDF and NCEP-ATP III definition respectively. The overall prevalence in Pakistan has been reported as 18-46%, comparable to rest of the south Asian countries. Intrauterine and early post natal under nutrition has been suggested as an important cause of the relatively high incidence of cardiovascular disease and metabolic syndrome in Indian.

Industrialization leads to increased prevalence of lifestyle disorders such as metabolic syndrome, obesity and DM etc in both the aged and in teenagers. Such

conditions are a new challenge for the healthcare providers and policymakers too. The concept of *Satkriyakala*⁴ is described as an opportunity for the physician to manage the disease at its different stages of the progression. So it is the need of time to understand the pathogenesis of different disease on the basis of Satkriyakala so that the metabolic disorders can be managed in better way.

Pathogenesis of Metabolic Syndrome on the basis of *Satkriyakala*:

1. **Sanchaya:** Due to excessive indulgence in *Adhyashana*, *Madhura*, *Sheeta*, *Snigdhaahara* (fatty diet) and lack of physical exercise, *Avyavaya*, *Divasvapna* etc. (sedentary life styles) with and without presence of *Bijadosa* (genetic predisposition), there is aggravation of all the three *Dosas* (specially *Kapha dosa*). This form of *Kapha* have physical similarity with *Ama* and *Medadhatu*, which get accumulated in vicious manner on those part of the body which are generally immovable and finally the whole nutritional pool is shifted towards strengthening of *Medadhatu*.

2. **Prokopa:** The increase quantity and quality of *Kapha* is responsible for the disturbed functions of *Agni* at different level in the body especially at the level of *Bhutagni* and *Medodhatvagni*. The deranged functions of *Agnis* results in



formation of *Ama* at that level. Because *Kapha* and *Meda* are of same nature that's why *Ama* formed at *Medodhatvagni* level gets mixed with circulating *Annarasa* / *Ahararasa* and causes blockage of micro channels (*Srotosanga*). This blockage of micro channels (*Srotosanga*) can be compared with the downstream signalling of the Insulin receptors due to excess formation of Free Fatty Acids i.e. FFA (*Ama*).

3. **Prasara:** If a person is still consuming fatty and high calorie diet and following sedentary life style, these preformed and newly formed FFAs (mainly from the visceral adipose tissue) are circulated in the body in the form of *Ama rasa*.

4. **Sthanasamshraya:** The circulating *Ama rasa* (FFAs from the visceral adipose tissue) gets localized at different places in the body. FFAs which are directed to the liver stimulate, release of different pro inflammatory mediators. In due course of time these inflammatory mediators play a key role in the pathogenesis of atherosclerosis. Most of the FFAs occupy the insulin receptors by molecular mimicry, may lead to Insulin resistance. Beside this, Insulin resistance causes an imbalance between production of NO and secretion of endothelin-I, leading to decreased blood flow and activation of

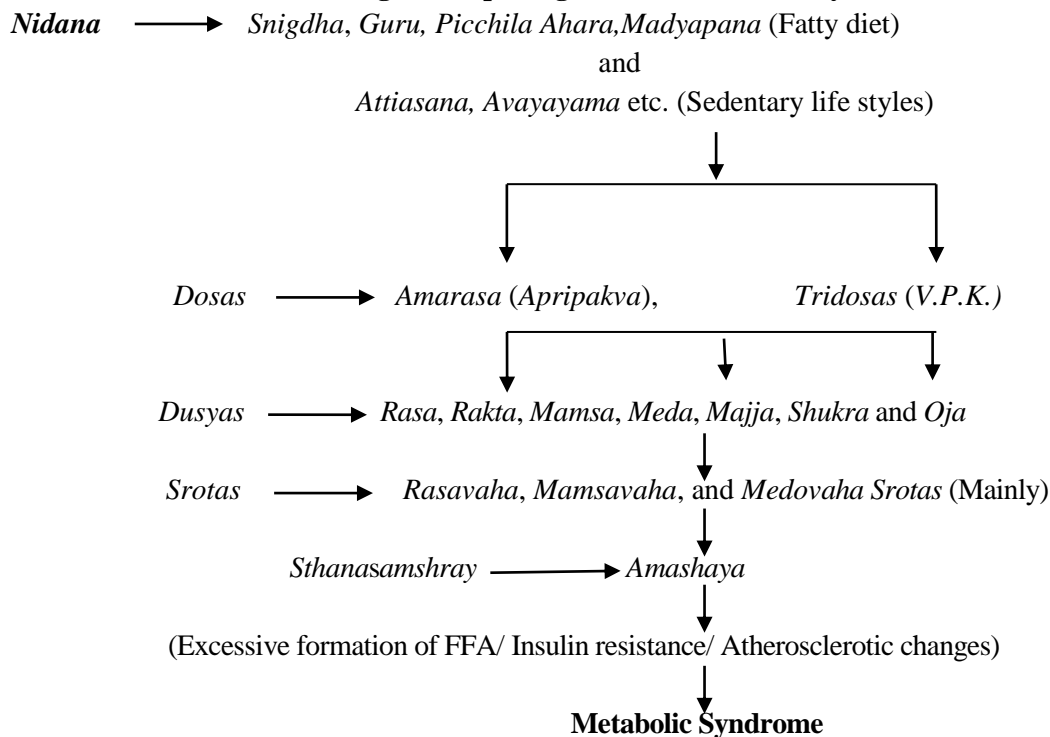
sympathetic system which may lead to developed Hypertension.

5. **Vyakta:** If the whole process is continuously going on, it causes downstream signalling of the insulin receptors due to occupancy by the circulating FFAs, which causes Insulin resistance and the condition known as Hyperinsulinemia. Initially this stage represents as postprandial hyperglycemias followed by fasting hyperglycaemia, the condition of Type 2 DM. FFAs are associated with increased production of Apo-B containing triglyceride which is a very low density lipoproteins (VLDLs). Reduced cholesteryl ester of the lipoprotein core along with cholesteryl ester transfer protein mediated alteration in triglyceride leads to hypertriglyceridemia⁵ i.e. decreased cholesterol content of HDL. Small dense LDLs are thought to be more atherogenic. They may be toxic to the endothelium, and they are able to transmit through the endothelial basement membrane and adhere to glycosaminoglycans and results in atherosclerosis and Hypertension.

6. **Bheda:** The *Upadrava* or the complication of Metabolic Syndrome such as Atherosclerosis and PCOD etc. can be considered as the different stages of *Bheda* of the disease.



Flow diagram of pathogenesis of Metabolic Syndrome



Samprapti Ghataka

Dosa	Predominantly Kapha (Mainly <i>Kledaka</i>), <i>Pitta</i> (Mainly <i>Pachaka</i>), <i>Vata</i> (Mainly <i>Samana</i> and <i>Vyana</i>)
Dusya	<i>Rasa, Rakta, Mamsa, Meda, Majja, Shukra</i> and <i>Oja</i> (Mainly Meda)
Agni	<i>Medodhatuagnimandya</i>
Srotas	<i>Rasavaha, Raktavaha, Mamsavaha, Medovaha, Majjavaha</i> and <i>Shukravaha</i> (Mainly Medovaha)
Srotodusti	<i>Sanga, Vimargamana, Atipravritti</i>
Adhithana	<i>Sarvashaira</i>
Udbhavasthana	<i>Amashaya</i>
Prasara	<i>Rasayani</i>
Ama	<i>Dhatvagnimandata janya</i>

Approach to management of Metabolic Syndrome as per Ayurveda:

The main therapeutic measures of Ayurveda were classified into two groups viz *Samshodhana* and *Samshamana*, in which the root cause of disease, were treated by

Samshodhana. Under *Samshodhana* therapy, the procedures like *Virecana, Shodhana basti* and *Ruksha udvartana* may be found clinically beneficial in cases of Metabolic Syndrome. Under the pacificator measures the following guideline may be helpful in the management of Metabolic Syndrome-

1. **Nidana Parivarjana:** *Nidana parivarjana* i.e evidence of the root cause is considered as the first step in the management of various disease. *Nidana parivarjana* is 'To avoid the risk factors'. Excess intake of carbohydrate and fat leads to abnormal visceral adiposity, which initiates cytokines, mediated pro-inflammatory process causes excess formation of FFAs, which occupies the



insulin receptors and that leads to Insulin resistance and other defective metabolism. Hence, *Snigdha*, *Guru*, *Pichhilaahara*, *Madyapana* (Fatty diet) as well as *Atiasana*, *Avayayam* (Sedentary life styles) etc. are to be avoided by the patients of Metabolic Syndrome.

2. Yoga and Asanas: The regular practice of yoga helps in balancing the metabolism as well as different functions of the body. The yogasana are not only the different poses of physical exercise but they are the scientific technique to enhance the awareness, relaxation, concentration etc. in the body as well as in mind. Important *Yogasanas* are *Dhanurasana*, *Halasana*, *Matsyasana*, *Yogamudrasana*, *Dolasana*, *Ustrasana*, *Vajrasana*, *Siddha yoniasana*, *Padmasana*, *Makarasana*, *Shavasana*, *Pavanamuktasana*, *Padotthanasana*.

3. Meditative Exercise: The *Pranayama*, such as *Anuloma-Viloma*, *Kapalabhati* and *Trataka* are helpful to balance the mental stressors. But these should be advised only after proper evaluation of cardiac functions of the patients.

4. Drugs acting on Agni: *Chitrakadi Vati*, *Againitundi Vati*, *Pippali Churna* and *Trikatu Churna* etc.

5. Ojas promoting drugs: Such as *Guduchi*, *Amalaki*, *Haridra*, and *Shilajatu* etc.

6. Compound formulations: Important compound preparations such as- *Ajmodadi Churna*, *Puskarabrahmi guggulu*, *Medohara guggulu*, *Triphala guggulu*, and *Sapragandha ghanavati* etc are found to be helpful.

7. Single drug: Some of the important single drugs are as follows *Puskaramula* (*Inularacemosa*), *Vrikshamla* (*Garieniacaebogia*), *Rasona* (*Alliumsativum*), *Shunthi* (*Zingiberofficinale*), *Haridra* (*Curcumalonga*), *Arjuna* (*Terminaliaarjuna*), *Guggulu* (*Commiphoramukul*), *Gudduchi* (*Tinosporacardiofolia*).



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