

# Metabolic Syndrome Ayurvedic View and Management

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## Abstract

Metabolic syndrome is multifactorial disease frequently associated with cluster of pathology including obesity hypertriglyceridemia, impaired glucose tolerance and insulin resistance; collectively referred to as the metabolic syndrome. There has been heightened awareness of metabolic syndrome and subsequent increase in the clinical attention directed towards prevention due to its strong association with premature morbidity and mortality. In particular there is predisposed concept that the individual has greater risk for developing type 2 Diabetes and cardiovascular disease. Ayurveda is a science intended from employing the measures of healthy life in which there is no direct reference of metabolic syndrome. Therefore, metabolic syndrome can be included under the broad umbrella of santarpanjanya vikaras. which a can put forward to a better management strategy by assessing the metabolic syndrome on the basis of santarpanjanya vikaras.

## 1. Introduction

Metabolic syndrome is multifactorial disease frequently associated with cluster of pathology including obesity hypertriglyceridemia, impaired glucose tolerance and insulin resistance; collectively referred to as the metabolic syndrome. Formerly it was known as a Met's syndrome acts and insulin resistance. There has been heightened awareness of metabolic syndrome and subsequent increase in the clinical attention directed towards prevention due to its strong association with premature morbidity and mortality. In particular there is predisposed concept that the individual has greater risk for developing type 2 Diabetes and cardiovascular disease. The prevalence of lifestyle diseases like hypertension, diabetes mellitus, dyslipidaemia and obesity has been exponentially increasing. Metabolic syndrome is a lifestyle disorder that has become a major public health challenge around the world owing to the rise of an obesity and sedentary lifestyle. Ayurveda is a science intended from employing the measures of healthy life in which there is no direct reference of metabolic syndrome. In Ayurvedic classics different scholars have varied opinions about the nearest possible diseases. Some scholars included it as the medopradoshaj vikaras (Diseases manifesting because of high fats) , while others classified it as santarpanjanya vikaras(Diseases caused by over nourishment) or Sthaulya updravas(Complications of obesity).Therefore metabolic syndrome can be included under the broad umbrella of santarpanjanya vikaras.And which a can put forward to a better management strategy by assessing the metabolic syndrome on the basis of santarpanjanya vikaras.

## 2. The history of Ayurveda:

History of medicine is fascinating subject as it is a saga of man struggle against the disease. As the civilization advances and as the disease pattern changes the medical science also changes. Ayurveda is the system of medicine that evolved in India with a rational logical foundation and it has survived as a distinct entity from remote antiquity to the present day. The fundamentals on which the Ayurvedic systems of medicine based are essentially true for all times and do not change from years to age. The origin of Ayurveda is attributed to the 'Atharva-veda' where several diseases are mentioned along with their treatments. There is evidence of organised medical care during that period also.

It should be remember that I Ayurveda is not is only the science of health but also helpful for living, prevention of disease, personal and social hygiene all comes under its ambit.

In Ayurveda, Panchamahabhutas or the five elements: Vayu (air), Teja (fire), Aap (water), Prithvi (earth) and Akasha (ether) are believed to build up the living microcosm (human beings) and the macrocosm (external universe). When combined in pairs, the Panchamahabhutas form Tridosha or the three humors namely Vata (responsible for body movement), Pitta (responsible for bodily chemical reactions such as metabolism and temperature) and Kapha (responsible for growth, protection, lubrication and sustenance). All these present the constitution or Prakriti of an individual, which determines the physical as well as mental characteristic of human. The concept is that health is achieved when there is a balance between these three fundamental doshas, whereas imbalance causes diseases. It has been pointed out that the positive health means metabolically well- balanced human beings. Based on these Panchamahabhutas and Tridosha, the Prakriti of an individual is determined and a distinctive treatment plan can be prescribed according to their unique constitution.

In spite of the spectacular results achieved by modern medicine, mainly through advances in the physical, chemical and natural sciences, there are vast areas of diseases which have eluded its therapeutic ambit .The study of a Ayurvedic system of medicine that has stood the test of time have a fruitful contribution to make in the overall alleviation of human suffering. The Indian system of medicine, Ayurveda, was evolved as a system with a rational and logical foundation. The fundamentals on which the Ayurvedic system of medicine is based are essentially true for all times and do not change from age to age. These fundamentals are based on human factors on intrinsic causes, not extrinsic causes. Civilization may change, human habits may change, the environment may change but humanity remains the same. Changes in the environment, new modes of living, new avocations, all might contribute to certain modifications of a disease or the appearance of new diseases.

The development of surgery the classifications of disease, the observations on signs and symptoms, prognosis and the descriptions of the nature, toxicity and therapeutic value of drugs as described in the literature all clearly demonstrate high level of knowledge which suggests that it have been possible for men only after detailed scientific approach. This also illustrates that these men were drawn from the highest intellectual and spiritual hierarchy who had the divine motive and compassion. Their whole purpose was to alleviate human suffering and their recorded precepts were for their disciples whom they trained for the service of humanity. Therefore the emphasis of the texts is on the practical aspects of medicine. The great seers through the practice of Yogic disciplines were endowed with the faculty of intuition which helped them to discover many truths even at the absence of physical instruments at that time..

In terms of literature, the fourth Veda written during Indian Civilization, Atharva-veda serves as the earliest authentic text discussing on the nature of existence, health and disease, pathogenesis and principles of treatment. The history of Ayurveda can be traced back to the period between the pre-vedic

periods (4000 B. C.-1500 B. C.). The uniqueness of this ancient medical system lies behind the vast variety of healing method used: Charms, plant and animal juices, natural forces (sun and water) as well as human contrivances.

According to Ayurvedavatarana (the descent of Ayurveda), Lord Brahma, the Hindu God of Creation passed on his “knowledge of life” to Daksha Prajapati and Ashwins, subsequently to Indra. This knowledge is then transferred to different rishis (sages), in which these disciples of Ayurveda wrote different treatises based on their interpretations. Here, both Bhardwaj and Dhanvantari received the knowledge from Indra. They later developed school of medicine and school of surgery respectively. From the knowledge in Atharva-veda, early texts of Ayurveda such as Charaka Samhita and Sushruta Samhita were developed. Although the former focuses on the causes of diseases and the constitution of a person, the later emphasizes on Ayurvedic surgery and the details of its techniques.

**Ayurvedic Medicine in the Vedas and Puranas:**

References to medicine are found in the earliest texts including the Vedas. The legendary version of the origin of the Ayurvedic system is that Brahma reminded it to Prajapati, who handed it down to Atreya Punarvasu etc. In the Rig Veda there are references to the first divine physician Rudra and of how the Aswini Kumaras cured Chyavana of senility. It was characterized as a disease of not one organ but of several organs, heart, lungs, spleen, intestines, rectum, even of the bones and marrow. This surprisingly modern view appears in the form of a prayer – the form in which medical instruction appear in Vedic literature. An even greater degree of anatomical and other knowledge is displayed in certain Upanishads – particularly in the Yogapanishads, which of course belong to a later period than the Vedas.

The tradition of medical knowledge is further carried during the period of the Puranas. References to drugs, diseases and health care are to be found in the epics. Thus we see in the Ramayana, that expert physicians attended on kings and they were capable of preserving dead bodies. In the Mahabharatha there are references to surgeons attending on the wounded and the disabled with all the appliances and equipment’s in the battle field.

**Charaka Samhita:** The work is a complete compendium of medical information, dealing with medical aspects, as aetiology, symptomatology, treatment and medical care in health and in disease. Equal in importance to the Charaka Samhita is another treatise called Sushruta Samhita. This work deals with surgical diseases, and diseases of the special organs such as the eye, ear etc. Ashtanga Samgraha and Ashtanga Hridaya-Next in the chronological order appeared another classical work, Vagbhata’s Ashtanga Samgraha. Vagbhata probably belonged to the second century A.D. He has summarized both Charaka and Sushruta and brought both medical and surgical diseases within the compass of a single treatise. Other Works of lesser calibre than Charaka, Sushruta and Vagbhata, but no less worthy of attention to the student of Ayurvedic medicine are Madhavakara, Chakra data, Sharngadhrara and Bhavmisra. Madhavakara (8th Century A.D.) comes first in the chronological order. He has written Nidana which deals with aetiology, diagnosis, pathology and prognosis of diseases. The work is not original but a compilation from various earlier texts. Its chief virtue is comprehensiveness. ‘Bhavaprakasa’ Samhita, the last and perhaps the best work of the medieval age, is that of Bhavmisra. The period from the 10th to the 16th Century A.D. Bhavmisra resumed the traditions of writing he reviewed the developments of the intervening period and incorporated in his work various new diseases and drugs. Bhavmisra included in his material medica certain drugs of foreign origin. One important point that is illustrated by Bhavmisra is that Ayurvedic medicines was not averse to adopting new

theories and the sole criterion for the selection of any drug or method of treatment was its ultimate benefit to the patient.

### 3. Sources of Ayurvedic medicines

The object of this system was to facilitate smooth passage of an individual towards 'Moksha', the ultimate salvation. The literal meaning of Ayurveda is "science of life," because ancient Indian system of health care focused on views of man and his illness. Ayurveda is also called the "science of longevity" because it offers a complete system to live a long healthy life. It offers programs to rejuvenate the body through diet and nutrition. It offers treatment methods to cure many common diseases. These scholars although stressed the importance of maintenance of health like their predecessors, also expanded their vision to pharmacotherapeutics. The therapeutic properties of plants, animal products and minerals were extensively described in their works. In therapeutics, emphasis was given on the use of medicinal plants, being more familiar and assimilable in the human body.

The Indian subcontinent is a vast repository of medicinal plants that are used in traditional medical treatments. The alternative medicines in the traditional systems are derived from herbs, minerals, and organic matter, while for the preparation of herbal drugs only medicinal plants are used. Use of plants as a source of medicine has been an ancient practice and is an important component of the health care system in India. In India, about 70 per cent of rural population depends on the traditional Ayurvedic system of medicine. Most healers/practitioners of the traditional systems of medicine prepare formulations by their own recipes and dispense to the patients. In India, around 20,000 medicinal plants have been recorded; In India, around 25,000 effective plant-based formulations are used in traditional and folk medicine. During the earliest times, the pharmacological and therapeutic utility of herbs was assumed on the basis of Doctrine.

Systematic utility of herbs can be found in Rigveda-Oushadhi Sukta(10.97.1-23) and also in the Atharvaveda (8.7.1-8 and 11.6.16-17) We also find references about the drug acting at the site of action i.e. different organs, joints, etc. receiving the drug administered orally.

Vedic practice of medicine is enriched with single drug therapy. At that time medicines was classified on the basis of habitat, Morphological classification, classification according to stem, classification according to leaf structure, Flower structure, as per fruits, basis of life span, biological activity. Later on Samhita periods the drugs were classified according to Guna (Properties), as well as Gana (Having common action) as per the need.

Pharmacopoeia of 'Ayurveda' comprises of drugs derived not only from herbs but also from minerals, metals and animal products. According to the principles of 'Ayurveda', there is not a single substance in the Universe which does not have a potential to be used as a drug, provided it is used judiciously by the physician where it is required.

According to the source of origin, the substances in the Universe are classified as 'Jangama' i.e. animal sourced e.g. milk, meat, blood, urine etc, 'Audbhida' i.e. plant sourced e.g. leaves, root, stem etc., and 'Parthiwa' or 'Khanija' i.e. mineral sourced e.g. gold, silver, copper, sulphur etc. (Sushruta Samhita 1992a -Sushruta Sutra 1/32 and Charaka Samhita 1984b-Charaka Sutra 1/68).

#### 4.1 Preparation of Ayurvedic Medicines – (Purely herbal Preparations)

The branch of Ayurveda that deals with medicinal preparation is Bhaishajya Kalpana. It formed from two words – bhaishaja (medicine) and Kalpana (preparation). medicines are Basic classification of Ayurvedic medicine

Swarasa – Herbal juices, Kalka – Herbal pastes, Shruta (Kashaya). – Herbal decoction; Sheeta – Cold infusions, Phanta – Hot Infusions, Swarasa -Herbal juice with or without adding water as per the herb used. In swarasa – this form is heavy to digest. Kalka- An herbal paste is made by grinding it fine with a mortar and pestle; water can be sprinkled over to make a fine paste. Shruta-Dried herbal drugs are commonly used to prepare Kashaya. Sheetha-Dried herbs are kept in hot water; mixed well and filtered the next day is known as Sheetha. Phanta-Dried herbs are kept in hot water; mixed well and filtered known as Phanta.

Apart from the above basic classifications, there are: Churna (Powders), Gutika (tablets), Rasa (soups), Paneeya(drinks), Kshira Paka(milk decoctions), takra Kalpa(Buttermilk based preparations), Panaka (Juices), Mantha (Juices obtained by churning ), Arka (Distilled forms), Rasakriya (Solidified decoctions ), Guda (sugar- jaggery based preparation ), Avaleha (Jam like preparations ) and many others.

Therapeutically Ayurveda uses single or multiple herbs (poly herbal).The Ayurvedic literature Sharnagadhara Samhita’ highlighted the concept of poly herbalism to achieve greater therapeutic efficacy. The active phytochemical constituents of individual plants are not adequate to achieve the desirable therapeutic effects. When combining the multiple herbs in a particular ratio, it will give a better therapeutic effect and reduce the toxicity. Based on the material of origin, Ayurvedic medicines are divided into three classes, namely herbal, mineral and animal. Among this, herbal formulation has gained great importance and rising global attention recently.

The discovery of herbals is further complemented with knowledge on the method of isolation, purification, characterization of active ingredients and type of preparation. The term “herbal drug” determines the part/parts of a plant (leaves, flowers, seeds roots, barks, stems and etc.) used for preparing medicines. Each and every part of the herbs is fully utilized for the different pharmacological action they may produce and made into a range of herbal preparations. Basically, it is the phytochemical constituent in the herbals which lead to the desired healing effect, such as saponins, tannins, alkaloids, alkenyl phenols, flavonoids, terpenoids, esters and lactones. A single herb may even contain more than one of the afore mentioned phytochemical constituents, which works synergistically with each other in producing pharmacological action. In Ayurveda, herbs are known to regulate bodily functions, cleanse and nourish human body. Each herb has five categories known as rasa, veerya, vipaka, prabhava and karma.Rasa (taste or sensation that the tongue experiences when in contact with the herbals) Each of the taste has an effect on dosha. Veerya (energy a herb releases when ingested).It can be sheeta (cooling) or ushna (heating).Vipaka (Post-digestive effect).Prabhava (special and unique power of an herb that has variable action)

These herbs do not fit in the category of other herbs that present the same rasa, veerya or vipaka, Karma (therapeutic action). Other than that, the doses, time of intake and Anupana (the carrier which the herbal medicines are prescribed with such as hot water, milk, honey, etc.) are also emphasized in the study of herbals under Ayurveda.

#### **4.2 Preparation of Ayurvedic Medicines – (Mineral & Herbomineral Preparations)**

The word Rasashastra literally means the “Science of Mercury”. However, it is a specialized branch of Ayurveda dealing mainly with materials which are known as ‘Rasa dravyaas’. They have the following three characteristic attributes: instant effectiveness, requirement of very small doses and extensive therapeutic utility irrespective of constitutional variation.

The post-samhita period is dominated by the renowned alchemist Siddha Naagaarjuna. In Samhita period Minerals were used, but their use was very much limited compared to the use of plants. Most of



the times the minerals were used in combination with plants (herbo-mineral drugs) but use of independent mineral drugs was also not uncommon. The minerals were subjected to intensive processing for giving them a form of drug. It is believed to have come into its proper existence with its scientific classification and documentation around 8th century. 'In today's scientific parlance 'Rasashastra' can be equated with 'Iatrochemistry'. The class of 'Rasa' is predominantly possessing 'Rasayana' (adaptogenic effect) effect. The belief that intensive and elaborate processing is required to make them fit for therapeutic utilization lead to the evolvement of sophisticated processing procedures. A distinct principle of producing a drug, compatible with human body, is observed in the processing of mineral substances. The mineral or metallic material is treated with plant or animal substances, compatible with the body. This treatment makes the processed material compatible and facilitates its easy assimilation. The processing of metals for their use in therapeutic formulations is very well described by 'Charaka' with reference to preparation of 'Lohaadi Rasayana' (Charaka Samhita-1984c-Charaka Chikitsa 1/3/15-23) and by 'Sushruta' with reference to 'Ayaskruti' (Sushruta Samhita 1992b-Sushruta Sutra 46/326-330). In post 'Samhita' period, a new class of drug- form termed as 'Bhasma' came into existence; to convert hard metal/mineral into fine and soft powder termed as 'Bhasma'. The mastering of the art of 'Bhasma' preparation heralded the era of use of relatively safe and effective mineral and metallic drugs by the physicians.

## 5. Indication and uses of various medicines:

Ayurveda does not divide disorders into the categories that we are familiar with but concerns itself with each element individually. What is treated in Western traditional medicine as an illness is regarded in Ayurvedic teachings as a symptom and a consequence of Doshas imbalance.

Ayurveda is divided into several disciplines or branches for the ease of categorization and organization. Ayurveda is divided into 8 major branches, known as Ashtanga Ayurveda mainly this classification is done on the basis of commonly observed diseases and their treatment.

The major eight branches of Ayurveda are:

1. Kaya Chikitsa
2. Kaumar Bhritya
3. Graha Chikitsa (Bhoot Vidya,)
4. Shalaky Tantra
5. Shalya Tantra
6. Agad Tantra
7. Rasayana
8. Vajikarana (Vrishya Chikitsa)

1. Kaya Chikitsa refers to internal medicine or general medicine in Ayurveda. It is a major branch of Ayurvedic medicine deals with prognosis, diagnosis, and treatment.

Sanskrit word Kaya denotes to the body or metabolism in the body and Chikitsa words indicates towards the diagnosis and treatment. It is a main discipline of Ayurveda. It includes diagnosis techniques, bio-cleansing or detoxification (Panchakarma), herbs and ayurvedic medicines, so it is a complete health science.

2. Kaumar Bhritya deals with health and diseases of children and obstetrics diseases. It can be divided into two parts as per modern sciences. One is Pediatrics, and another is Obstetrics. In ancient times, Ayurveda had put these two branches of medical science in a single discipline because both concerned with children.

According to Ayurveda, Kaumar means child of age 0 to 16 and Bhritya refers to care and hygiene. Kaumarbhritya is the science that provides preventive and curative measures from the fertilization of eggs to the development and growth of children up to the age of 16. 3. Graha Chikitsa (Bhoot Vidya) is the science of mental life, mind and its characteristics. It is the branch of Ayurvedic sciences dealing with the prevention, diagnosis, and treatment of mental disorders. The methods used in Bhoot Vidya are related to correcting emotions, mental beliefs, eradicating illusions and providing calmness to the mind through herbal smokes. In modern, it can be correlated with: Psychiatry, Psychology, and Psychotherapy. 4. Shalaky Tantra deals with the ear, nose, throat, and eye. Therefore, it belongs to Otorhinolaryngology (ENT) and Ophthalmology (Eye), as per modern medical science.

5. Shalya tantra is the branch of Ayurvedic science that treats and manages injuries and diseases by operative procedures. It is correlated with modern surgery.

6. Agad Tantra is the branch of Ayurvedic pharmacology that deals with the effects and nature and treatment of poisons.

7. Rasayana is the branch of Ayurvedic sciences deals with the rejuvenation of the body, prevention of the diseases, and ways for long and healthy life. It includes Ayurvedic nutrition, Ayurvedic supplements. In modern, it can be correlated with dietetics, immunology, and geriatrics i). Ayurveda has contributed a great concept of **Acharya Rasayana**. It is about the codes of conduct how person should live and what he should do or should not. In Ayurveda, it is an integral part of preventive medicine (SWASTHAVRITTA). Acharya Rasayana helps to have a good control on mind. It helps reducing psychosomatic disorders and strengthens the mind. ii) Medhya Rasayana is a group of Ayurvedic nootropic herbs or medicines, which enhance cognitive functions and improve memory. Medhya Rasayana are Ayurvedic supplements, which improve the power of acquisition, retention, and recollection; these supplements also boost immunity and improve functions of immune system. iii) Triphala Rasayana- The formulations described in Charaka Samhita, which mainly contain Triphala as a major ingredient and beneficial for rejuvenative purposes and useful in preventive medicine, are known as Triphala Rasayana improves quality of life and increases the lifespan, slows down the process of aging, also good for eyes and improves haemoglobin level, improves digestion, assimilation of food, reduces gastritis, and improves liver functions. 8. Vajikarana (Vrishya Chikitsa): Vajikarana (Vrishya Chikitsa) is the science of aphrodisiacs. It includes aphrodisiacs herbal and Ayurvedic medicines for improving physical strength.

Drug formulation in Ayurveda is based on two principles: Use as a single drug and use of more than one drugs, in which the latter is known as PHF. This key traditional therapeutic herbal strategy exploits the combining of several medicinal herbs to achieve extra therapeutic effectiveness, usually known as polypharmacy or polyherbalism.

## 6. Latest updates on Metabolic syndrome (Research)-

Metabolic syndrome is result of improper metabolism. In Ayurveda metabolism is considered the function of Agni. Metabolic syndrome (MetS) forms a cluster of metabolic dys-regulations including insulin resistance, hypertension, atherogenic dyslipidemia, central obesity. In Ayurveda above features have been mentioned as the result of Medavaha Sroto dusti. The pathogenesis of MetS encompasses multiple genetic and acquired entities that fall under the umbrella of insulin resistance and chronic low-grade inflammation. If left untreated, MetS is significantly associated with an increased risk of developing diabetes and cardiovascular diseases (CVDs). So it can be said as the condition of Vyadhi

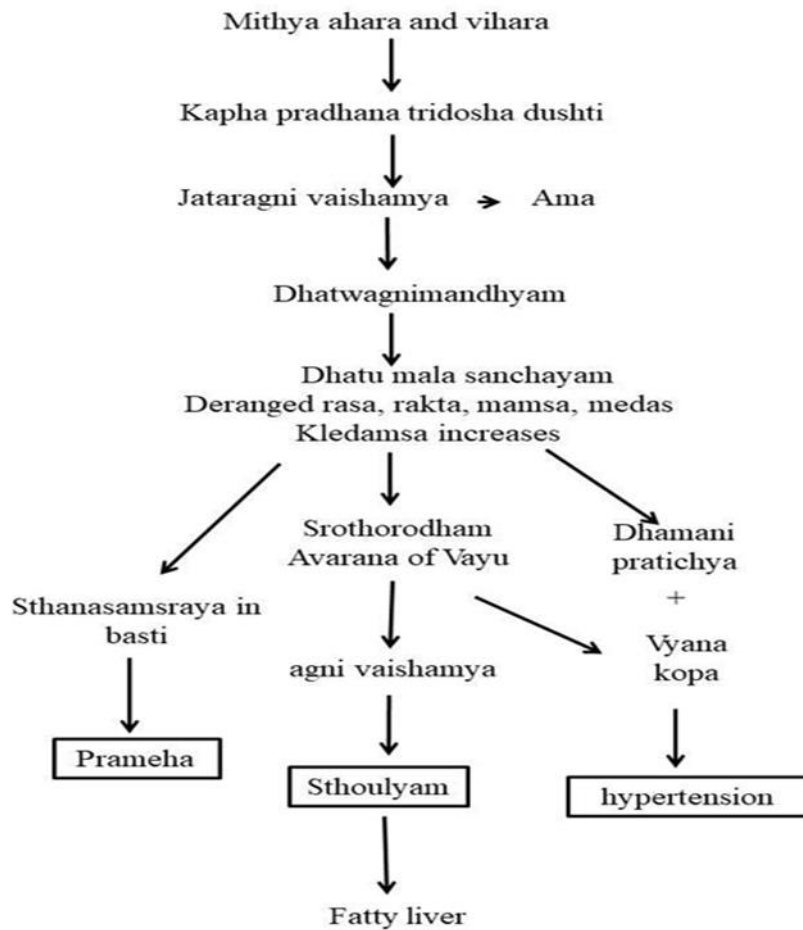
sankara (Co-existence of diseases). Given that CVDs constitute by far the leading cause of morbidity and mortality worldwide, it has become essential to investigate the role played by MetS in this context to reduce the heavy burden of the disease. As such, and while MetS relatively constitutes a novel clinical entity, the extent of research about the disease has been exponentially growing in the past few decades. However, many aspects of this clinical entity are still not completely understood, and many questions remain unanswered to date. In this review, we provide a historical background and highlight the epidemiology of MetS. The pathophysiology of the MetS encompasses several complex mechanisms that are yet to be fully elucidated. In addition to genetic and epigenetic factors, some lifestyle and environmental such as overeating and lack of physical activity have been identified as major contributors to the development of MetS. A causative role can be given to high caloric intake since visceral adiposity has been shown to be an important trigger that activates most of the pathways of MetS. Among the proposed mechanisms, insulin resistance, chronic inflammation, and neurohormonal activation seem to be essential players in the progression of MetS and its subsequent transition to CVDs and T2DM.

It is much difficult to describe MetS in Ayurvedic parlance. There is no reference of single entity, which can be directly correlate with MetS. Different scholars have different opinion about the nearest possible diseases. Santharpanam means to cause immense pleasure, contentment or nourishment. Hence Santharpanajanya vikaras can be considered as diseases due to over nourishment or pleasure.[10] Santharpana janya vikaras are Prameha (Diabetes), Pitaka, Kandu, Kotha, Pandu, Jwara, Kushtham, Amapradoshha, Mutrakricchra, Arochakam, Tandra, Klaibyam, Atisthoulyam, Alasyam, Gurugatrata, Indriya srotasam lepa, Buddhermoha, Prameelaka and Sopha. [25] A combination of genetic and acquired factors contributes to MetS. Environmental and lifestyle factors such as consumption of excess calories and lack of physical activity are the major contributors. [2] Atisthoulyam (obesity) and Prameham (diabetes) are components of MetS. Prameha is said as Kulaja vikaras. Diseases in which Beejadushti as Nidan (causative factor) are termed as Kulaja vikaras. [11] According to Acharya Charaka, offspring born to a woman who takes excess Madhura rasa during pregnancy is said to have predisposition to the development of Sthoulyam and Prameha.[26] So, Beejadushti can be correlate to genetic factors. Excessive consumption of Madhura (sweet), Amla (sour), Lavana (salt), Guru (heavy), Snigdha (unctuous), Nava annapanas (Food grains used up within one year after harvest), Gramya oudaka anupa mamasa rasas (meat of aquatic animals and of those living in marshy areas), Payas (milk), Guda ikshu vikrtis (Food made of Jaggery, sugar cane) are the Aharaja nidanas mentioned in Prameha, Atisthoulyam and Santharpanajanya vikaras. Vihraja (Regimens) nidanas include Asyasukha (sedentary life), excessive indulgence in Nidra (sleep), Avyayama (lack of physical activity), Divaswapna (day sleep), Avyavaya (lack of sexual life). Achintana (lack of Tension) is mentioned in the Nidan (causative factors) of Sthoulyam, Prameha and Santharpanotha vikaras. Harshnityatvata (uninterrupted cheerfulness) is specifically stated among Sthoulyam nidanas. [27, 28, 21] of disease can be stopped.

Medavaha Srota dusti is the initial stage of metabolic syndrome. So the nidana (Causative factors) and samprapti (Pathogenesis) of Medavaha Srotasa dusti can be helpful to understand Ayurveda Aspect of metabolic syndrome. Some consider it as Medo-pradooshajavikaras (Diseases due to vitiated fat), because Medas is the prime Dooshya involved in the pathogenesis.[3] sedentary lifestyle, oily, heavy food, excessive calorie consumption and lack of exercise or physical exertion etc. mainly vitiate Agni especially Medadhatvagni. Above Nidana vitiate Agni, produce ama (toxins in the body), Kapha and Meda. So metabolic syndrome can be said Santarpana janya Vyadhi. The Again, some scholars associate MetS with Avaranajanyaroga (Disease developed due to occlusion of Srotasa), as Avarana is involved in



the pathogenesis of Madhumeha and Atisthoulya, both of which are considered as components of MetS.[22] Now a day’s most of the diseases are of Santarpanjanya mainly caused by sedentary stress full life and change in eating habit. It then vitiates Kapha, Mamsa and Meda, and causes various metabolic disorders like Prameha (diabetes), Atistoulya (obesity), Sopha (inflammatory conditions), Dhamani prathichaya (atherosclerotic changes) etc. These were some of the common manifestations in MetS. Thus the concept of MetS can be connected with Santarpanjanya vikaras. [23] Prevalence of MetS has increased considerably reaching pandemic proportions worldwide. International Diabetic Federation (IDF) estimates that approximately 25% of world population have MetS. it may vary widely due to the age, ethnicity, gender etc. The prevalence of MetS in India has documented to be from 11% to 41% across the vast country with copious socio economic cultures. For complete understanding of metabolic syndrome as per Ayurvedic perspective we can divide the condition of metabolic syndrome in three stages;



**Treatment principal for medavaha sroto dusti: [15]**

Treatment of medavaha sroto dusti includes same principle of treatment of Sthaulya (Obesity), like; Kaph medahara(which reduces kapha and fat) and vatanulomaka (propelling faeces and flatus in downward direction) Anna pana

**Table-1 Correlation of symptoms in Modern medicine with Ayurvedic terms in the stages of Metabolic syndrome.**

Stages	of	Conditions according the stage of	Ayurveda correlation
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Metabolicsyndrome	metabolic syndrome	
1.Initial stage of metabolic syndrome	<ul style="list-style-type: none"> <li>Mild increase in waist circumferences</li> <li>Pre diabetes</li> <li>Pre hypertension</li> <li>Mild dyslipidemia</li> </ul>	<p><i>Medavaha Sroto dusti:</i></p> <p><i>Atisthula Laxana</i> and <i>Prameha Purvarupa.</i></p>
2.Middle stage of metabolic syndrome	Obese patient having fully developed diabetes and hypertension with mild to moderate dyslipidemia	<i>Santrapana</i> and <i>Avaranajanya Madhumeha (Sthula pramehi)</i>
3.Later stage of metabolic syndrome	Obese patient having early changes of CAD and complication of diabetes and hypertension.	<i>Upadrava</i> of <i>Madhumeha, Sthaulya</i> and <i>Avarana.</i>

- Niruha basti (Medicated decoction enema ) prepared with Ruksh, Ushna and Tkshana Aushadha
- Udvardana(Srubbing) by Ruksha Aushadha

Internal administration of Drugs: [16] Guduchi, Bhadramusta, Triphala, Takrarista, Madhu, Vidangadi Lauha Yava+ Amalaki pryoga, Bilvadi Panchamula kwath with honey, Agnimanth Svaras, Shilajatu prayoga

Pathyapathya(Diets): Pathya (To do): Daily exercise, Jirne Bhojana (to take food after complete digestion of previous food), Maximum use of Yava (Barely) and Purana Godhuma (Old Wheat) for food  
 Apathya: Ahara( Food Don'ts): Very less mental exercise, Lack of Samshodhana of vitiated and accumulated dosha ,High calorie diet, like fast foods, Excessive and daily use of meat, Excessive use of milk/dairy products like curd, paneer, ghee, sweets, Excessive alcohol consumption.

Vihara (Regimen Don'ts): Lack of exercise, Daytime sleep, Adhyasana(repeted eating before digesting previous food.), Vishamashana(Irregular food intake in quantity as well timings

Middle stage of metabolic syndrome:

It can be compared with Avaranajanya madhumeha In Ayurveda. Sushruta has mentioned it as Sthula pramehi. Hetu(Causes):[17]Lack of Samshodhana of vitiated and accumulated dosha,

Linga (Sign and Symptoms):[18] Excessive increase of Shleshma and Pitta leads to Avaran of vata and obstructed vata excrete Ojas with urine and so urine becomes like Madhu (Honey) in taste and colour which is called Madhumeha.Patient feels Ojas Kshaya Laxana (Depleted vigor and immunity) due to excessive secretion of ojas with urine. Patient feels either symptoms of Vata, Pitta or Kapha frequently and ultimately becomes emaciated.

Treatment middle stage of metabolic syndrome:[19]

Upakrma (Line of treatment): Langhana(Lightness/Deprivation), Rukshana(Drying), Bruhana (Nourishing), Snehana (oleation). In condition of excessive dosha Samshodhana(Cleansing) like vamana and virechana should be given. If Dosha are moderately vitiated Vyayama and Pachana drugs can be used. Rukshana can be done with udavartana of powder of drugs having Kashaya, Ruksha and laghu properties.

Internal Drugs: Phalatrikadi Kwath, Nisha Amalaki, Ayaskruti, Shilajatu rasayan, Khadir Rasayana, Tuvaraka rasayana

Later stage of metabolic syndrome: It can be compared with complicated case of Avarana and Madhumeha. If Madhumeha not treated timely and properly, its complication likes carbuncles devolves in vital parts and muscular area.

Upadrava of Avarana (Complication of Avarana stage diabetes): Cardiac disease, Abscess, Splenomegaly, Tumour in Maha Srotasa, Diarrhoea

Treatment of Later stage of metabolic syndrome: [20] Patient having complications due to avarana should be treated with Anabhishyandi, Snigdha, Shroto shodhaka, Vatanulomana and kapha, pitta Aviruddha drugs.

Rasyana Prayoga: Shilajatu with milk, Guggulu, Lasuna(Garlic)

According to Harmonized Criteria, any three of the five components would suffice for a diagnosis of MetS, with the thresholds for measuring waist circumference (WC) requiring ethnic and nation specificity. [24]

**Table 2: Definition of Metabolic syndrome - Harmonized criteria**

Risk factor	Defining level
Waist circumference	Population and country - specific
Elevated triglycerides	≥150mg/dL (1.7mmol/L) or on drug treatment for elevated triglycerides
Reduced HDL-C (High Density Lipo protein Cholesterol)	≤40mg/dL (1.03mmol/L) in men ≤50mg/dL (1.3mmol/L) in women or on drug treatment for reduced HDL-C
Elevated blood pressure	≥130mm Hg systolic blood pressure or ≥85mm Hg diastolic blood pressure or on antihypertensive drug treatment in a patient with a history of hypertension
Elevated fasting glucose	≥100mg/dL or on drug treatment for elevated glucose.

Early diagnosis is important in order to employ effective lifestyle and risk factor modification. Pharmaceutical therapy in MetS is aimed at treating the individual components. According to Ayurveda, general management of any disorder is divided into Apakarshana (Expulsion of unwanted harmful elements from the body), Prakrthi vighata and Nidana parivarjana.[29]Nidanaparivarjanam- Individuals diagnosed with MetS should be properly educated to avoid the risk factors like excessive intake of carbohydrates and fats, sedentary life style, smoking, alcohol etc. The aim of Prakrthi vighata is to bring back the equilibrium of the Dosha and to facilitate the normal functioning of Dhatus and Malas. Langhana should be adopted in general as it is a Santharpanooha vyadhi. Langhana chikitsa is of two types- Sodhana and Samana.[30] Sodhana(Purification) therapy should be adopted in patients who are having sufficient Bala (strength) or in whom Doshas are markedly vitiated.[31] Virechana(Purgation) is more preferable, it is a specific modality for the elimination of Pitta dosha but it is also effective upon Kapha and Vata.[32] Acharya Charaka has mentioned Vamana(Therapeutic emesis) Karma and Virechana Karma in the management of Santarpanajanya Vyadhi. On the other hand, if the patient does not have sufficient bala (strength) to undergo Shodhana therapy or when Doshas are moderately vitiated, Shamana(Pacification) therapy can be adopted.[30] In MetS, disease is of chronic nature and long term practise of drug is essential. So Shamana therapy is more beneficial. Drugs having Deepana, Pachana, Lekhana, Medakledo Upasoshana, Tridoshasamana, Ushna veerya will be the more appropriate which

helps in alleviating Agni vaishamya, removing Srothorodha and Kapha-medo dushti. Mets involves a constellation of Vyadhis like Prameha, Sopha, Hrdroga, Sthoulya etc, Drugs acting on particular diseases like Mehajith, Hdroghasamana, Sophahara, Medorogahara, Yakrt uttejaka (Activating Liver) were used. Free radicals and the oxidative stress caused by them play a key role in the development of many diseases such as atherosclerosis, Diabetes mellitus, CVDs, dementia, stroke, and so on. Drugs with Rasayana properties are beneficial in these conditions as they are rich in Vitamin C, Vitamin E, Beta carotene, riboflavin, and other substances that can counteract the damaging effects of oxidation.[33] As a result, they act as anti-oxidants. They also augment the regeneration of hepatocytes, pancreatic beta cells etc.

### **7. Future perspective:**

In future work Ayurvedic scholars can identify the exact causative factors in individual person, which contributed him to the recent condition and treat him efficiently along with on the basis of the presently gained knowledge from the previous works and different article they can make the list of specific symptomatology, preventive measures to be taken, solid treatment and diet protocols.

### **8. Benefit of Ayurvedic therapy apart from Allopath (Modern medicines):**

Ayurveda is a system of medicine that is based on the principles of nature. Ayurvedic medicines are believed to have many benefits over allopath medicines. These benefits include being less harmful to the body, being more effective in treating certain conditions, and being easier on the stomach.

1. As Ayurvedic tablets work on the base of an ailment they are more effective in treating overall health problems also focus on restoring balance in the body instead of just treating symptoms. While allopath drugs many a times are typically prescribed in order to suppress symptoms rather than curing the underlying cause of a condition.
2. Ayurveda is a holistic system of medicine that focuses on the whole person. This means that Ayurvedic tablets can help to improve overall health by providing relief from various symptoms. They are safe, easy to use, and have a wide range of benefits.
3. Ayurvedic treatments are tailored specifically to the individual needs of the patient. So there is less medication required than allopathic treatments. This can lead to significant cost savings for patients and their families.
4. Ayurvedic treatment can be used in combination with other types of treatments, such as allopathic medicines and acupuncture.
5. They work quickly to reduce inflammation and help to improve overall stamina and well-being. In addition, they are non-invasive. The use of Ayurvedic PHFs [Poly herbal medicines] has stood the test of time. Using the Ayurvedic concept of Panchamahabhutas and Tridoshas, PHFs provide treatment of diseases in a holistic approach. Today, the “renaissance” of Ayurvedic PHFs has occurred the world over, owing to its comparable efficacy, fewer side effects and better acceptability than allopathic drugs. Most of the time, they produce satisfactory effect and safety, making them one of the highly selected drugs of choice.

### **9. Summary and Conclusion:**

Metabolic Syndrome is a disease of modern era which is more prevalent in people leading a sedentary lifestyle. In Charaka Samhita lack of physical activity and unhealthy eating habits which are the causes

of lifestyle diseases are mentioned in Santharpaneeyam adhyayam.[5] Excessive consumption of energy dense foods and drinks, etc are all considered as risk factors for metabolic syndrome-factors lead to vitiation of Kapha, and produces Agnimandhyam (impairment of digestive fire). Further Intake of same Nidanas (Causative factors) leads to Dhatvagnimandya and Dhathumala- sanchaya (accumulation of metabolic waste) which cause Srothorodha (occlusion of channels). This Srothorodha can be co related to insulin resistance. Here Katu(Pungent), Tikta(biter) and Kashaya rasas are more beneficial. They are Deepana pachana, Lekhana and Medakledo upasoshana. It aids in Amapachana, alleviating vaishamya, removing Srothorodha and Kapha-medo dushti. [44]

Avyayama (Lack of physical exercise) and Divasvapna (day sleep) are the main Viharaja nidanas contributing to the development of metabolic syndrome.[31] Avyayama or lack of physical exercise causes the increase of Guru guna. Similarly Divaswapna also increases Abhishyandi and Guru gunas. Behavioural factors like lack of enthusiasm, over indulgence in luxury, laziness, greed, etc. are the key factors that make an individual adopt sedentary life style and excessive consumption of food. So, they should be considered as etiological factors. . [28, 29, 21]According to Acharya Charaka food is not properly digested if a person is afflicted by deep thoughts, grief, fear, anger etc. this will lead to Agnimandya and Ajeerna (indigestion). In chronicity this will lead to Dhatvagnimandya and Dhathumalasanachaya.[32] Increased Kapha dushti and Agnimandhya which further cause Ama (toxic metabolic wastes). Ama has Picchila and Guru guna and it causes manifestations like Srothorodha.

Then the various components in MetS will manifest in different ways either alone or in combination. Due to the Avarana by Medas, movement of Vata (especially Samana and Vyana vata) get obstructed and is specially confined to Koshta. This vayu aggravates Pachaka pitta resulting in Agnivaishamya, which causes Kshudadhikya, then it will leads to Mamsa medho dhatu adhvrdhi and the person becomes Sthoola. [28]

Srothorodha causes aggravation of Vata, Vata along with other Doshas vitiates Soumya dhatus like rasa, Rakta. Mamsa, Medas lasika etc got Sthanasamsraya in Vasti, and manifested as Prameha. Insulin resistance is the main mechanism in the pathogenesis of MetS. It is the inability of target tissues to respond to actions of insulin even if it is adequately present in blood. So, Insulin resistance can be considered as a Srothorodha due to Bahudrava kapha, Kleda and other Dooshyas. Hyperinsulinaemia occur as a result of insulin resistance, which can be considered as Mala sanchaya.[29]

Srotholepa caused by Picchila guna of Kapha and Kleda vitiate rasa and Raktha dhathu will lead to Dhamani prathichaya (atherosclerotic changes) which can be considered as elevated triglycerides and LDL-C. Again, Srothorodha will lead to Vyanavathakopa along with other Vayus. Thus we can explain the peripheral vascular resistance leading to hypertension in metabolic syndrome. Due to Nidanas, there is Kaphavidhi and due to resultant Koshtagni and Dhatvagni mandya, Dhathus formed will be improper and there will be formation of Ama and Kleda. Kledayuktha rasa and Raktha will lead to Vyanavatha kopa in Svasthana i.e., Hridayam leading to increased cardiac output which also contributes to hypertension. [45].

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