INTERPRETATION OF METABOLIC SYNDROME IN AYURVEDIC PARLANCE

Pandey Shipra  Kamat Nitin1
Department of Kayachikitsa, Tilak Maharashtra Vidypeeth, Pune, Maharashtra, India
1Dept. of Kayachikitsa, Sion Ayurvedic College, Mumbai, Maharashtra, India

ABSTRACT

Obesity, diabetes mellitus are increasing in epidemic proportions globally. Metabolic syndrome described in modern science, includes clinical conditions involved in obesity, Diabetes mellitus, pre-diabetes as said in medo roga. Obesity is a principal causative factor in the development of metabolic syndrome. Here we report that increased oxidative stress in a accumulated fat is an important pathogenic mechanism of obesity associated metabolic syndrome. In this context we discuss the ayurvedic concept of medo roga and "ama" which is thought to be a toxic, pro inflammatory waste product of improper digestion.

Keywords: Ama, Medo roga, metabolic syndrome

INTRODUCTION

Metabolic syndrome is a disorder of energy utilization and storage, diag- nosed by a co-occurrence of 3 out of 5 of the following medical conditions: abdominal (central) obesity, elevated blood pressure, elevated fasting plasma glucose, high serum triglycerides, and low high-density cholesterol (HDL) levels. Metabolic syndrome increases the risk of developing cardiovascular diseases, particularly heart failure, and diabetes.1

AIMS AND OBJECTIVES

To correlate the pathology of metabolic syndrome with medo roga
To understand symptoms of metabolic syndrome with special reference to agni, (digestive fire), dhatvagni, ama and marga avarodha (obstruction of channels)

Metabolism, relates to the exchange of substances and it is invariable sign of life. Modern terms metabolism, Catabolism and anabolism refer exactly to dhatwagni vyapara or paka, comprising the kitta paka and prasada paka, respec- tively. Catabolism implies the breakdown of large molecules and end products are of smaller size than the starting material. In addition catabolic reaction is essential energy yielding. Anabolic process are generally ‘energy requiring’. The metabolic processes that occur in the body into two well defined compartments viz, i) the metabolism of food stuffs –the exogenous metabolism and the metabolism of tissues- the endogenous metabolism.2

Obesity is the central and causal component in this syndrome, but the mechanistic role of obesity has not been fully elucidated. Oxidative stress plays critical roles in the pathogenesis of various diseases. In the diabetic condition, oxidative stress impairs glucose uptake in muscle and fat and decreases insulin secretion from pancreatic β cells increased oxidative stress also underlies the path physiology of hypertension and atherosclerosis by directly affecting vascular wall cell.3

As an early instigator of obesity-associated metabolic syndrome, increased
oxidative stress in accumulated fat should be an important target for the development of new therapies.

**MATERIALS AND METHODS**

This article is based on review of ayurvedic and modern texts along with researches related to the subject. Materials related to metabolic syndrome and medoroga have been collected. The main ayurvedic texts used in this study are Charak samhita, Sushruta samhita, Madhava nidana and available commentaries on them. We have also referred to the modern texts and searched various research papers, websites to collect information on relevant topics.

**Critical analysis of above stated references**

**Aetiology**

Due to disturbance in digestion process of anupaka as described in charaka chikitsa sthana chapter 15 in Grahani Adhyaya lies cause of metabolic syndrome. These term anupaka refer to the breakup of compound substances, for e.g., the sweet tasting substances, into their ultimate molecular components e.g., the intestinal monosaccharide.

Medoroga described in the various classical text of ayurveda referring to excess of fat deposition in the body resulting in flabby appearance. The nidana (aetio-pathogenesis) of medoroga is given in the classical text of madhava nidana. “Avyayamadiwaswapnasleshmalahara sevinah I Madhuronnarasah prayah snehanmedah pravardhayet II Medha savrutamarmartgatwat pushvantyane na dhatah I Ma.Ni 34/4

In a person who a) over-indulges in articles of food that conduce to the production of sleshma, b) leads a sedentary life and is averse to physical exercise c) over eats and resorts to day sleeping, the predominantly sweet tasting rasa circulates throughout the body, very much like ama. From this sweet-tasting amarasa is formed sneha or oil and medas or fat. The latter contribute to atisthaulya or excessive corpulence.

**Pathology of Metabolic syndrome**

The citation Madhurannarasah snehatmedah pravardhayat and the tikas (commentaries) on the above extracted from madhukosha and atankadarpana on madhavanidana are obviously based on the earlier observations of Sushruta and Charaka and Dalhana’s commentary on the former, in regard to the convertibility of sweet tasting substances as fat in such conditions as sthaulya (adiposity / corpulence/obesity) and karshya (wasting /leanness) are determined by rasa. Hence as mentioned in rasavaha strotas dusti hetu rasavahini dusyanti chintanam ati chintanat can be linked with oxidative stress mentioned in modern science.

Dalhana has, in his commentary on the above, clarified a number of important points of which the following are significant. Elucidating the implications of the term Aamavah annarasa madhurtarsh, he has observed that the production of amarasa (partly or incompletely formed chyle) does not arise in the case of medasvis (corpulent persons) whose agni is dipta. These are cases in which the digestion of food is rapid, complete and absorption quick. The production of ama, at the level of intestinal digestion does not occur in such cases. To say that medasvis whose agni is dipta produce ama rasa will be introducing an element of contradiction, as only mandaagni can produce ama. The correct interpretation of the passage, under reference, is that it is dhatavagni that is manda and, in consequence, ama is produced at the level of dhatavagnipaka. In other words, the annarasa (chyle), after its
formation and absorption is not properly dealt with by dhatvaagni. This results in the circulation un metabolised substances². Due to the covering avruta of the margas or pathways by medas or fat and vishistahara, the predominantly sweet tasting substances, in circulation, are turned over as medas or fat, which later alone accumulates in the body. Dhatus, other than medas (adipose tissue) viz., asthi (bone tissue), majja (yellow and red marrow) and shukra (reproductive tissue elements) are not properly nourished and formed and they deteriorate⁵. Hence we see osteoporosis and infertility in such cases.

DISCUSSION

Signs and Symptoms of Metabolic syndrome with special reference to medoroga

Under current guidelines, revised in 2005 by the The US National Cholesterol Education Program Adult Treatment Panel III (2001) requires at least three of the following:

- Fasting glucose ≥100 mg/dL (or receiving drug therapy for hyperglycemia)
- Blood pressure ≥130/85 mm Hg (or receiving drug therapy for hypertension)
- Triglycerides ≥150 mg/dL (or receiving drug therapy for hypertriglyceridemia)
- HDL-C < 40 mg/dL in men or < 50 mg/dL in women (or receiving drug therapy for reduced HDL-C)
- Waist circumference ≥102 cm (40 in) in men or ≥88 cm (35 in) in women; if Asian, ≥90 cm (35 in) in men or ≥80 cm (32 in) in women¹³.

Medoroga (obesity) has been considered as an abnormality of body characterized by-

- Excessive increase of fat and other tissues of body.
- Bulky look of body.
- Pendulous situation of buttocks, abdomen and breast.
- Excessive anabolic conditions.
- Lack of vitality.
- Dyspnea on exertion
- Voracious appetite
- Excessive sweating and Bad odour from the body⁵

Obesity & Diabetes: Increased blood sugar level: The outcome of scientific researches in the field of biochemistry, in modern times, provides a wealth of very valuable data and these should be of considerable value to understand intelligently the practical implications of the ayurvedic siddantha or conclusions i) madhura rasa dravya is the source of bala or karmadhana-shakti; ii) it also contributes to brihmana; iii) it is convertible to sneha (oil) and medas and iv) in certain abnormal conditions engendered by dhatvagnimandya and the niruddha or blocking of and avarana or encompassing the dhatugati or metabolic pathways and dhatumargas or the channels of distribution of nutrients, the madhura dravyas are transformed en masse into fat, leading to corpulence (obesity)². Such conditions are marked by lack of bala or energy, susceptibility, among others, to prameha (diabetes mellitus), pidaka (carbuncle), vatarogas (nervous system diseases) etc. A correct appreciation of the earlier Ayurvedic observations viz., madhura annarasa snehameda pravaryat and amaava annarasa madhurtarsch etc will be possible only when the scientific data is provided².

The Ayurvedic concept of “Ama” is similar to the Egyptian concept of “Ukedu,” and the old theory of intestinal auto-intoxication propounded by Metchnikoff. Thus, Metchnikoff believed that proteolytic gut bacteria can produce toxic byproducts (phenols, indoles, and ammonia),
from digestion of dietary proteins. These toxic byproducts of digestion accumulated with age and caused disease. Interestingly, modern evidence supports Metchnikoff, since bacterial species which metabolize dietary carcinogens (heterocyclic amines) from cooked meat and fish are associated with increased risk of tumors. The link between intestinal auto-intoxication and disease is concordant with Ayurvedic concepts on “Ama” and its pathogenic potential.

Obesity and Hypertension, Atherosclerosis or fatty deposits in blood vessels: Cholesterol is carried in the blood as two compounds: Low-density lipoproteins (LDL) and High-density lipoproteins (HDL). HDL is also called the 'good' cholesterol and LDL is also called the 'bad' cholesterol. Obesity is associated with low levels of good (high-density lipoprotein) cholesterol and high levels of bad (LDL) cholesterol. When cholesterol levels are high, some of the cholesterol is deposited on the walls of the blood vessels. Cholesterol deposits reduce the elasticity of blood vessels, narrows blood vessels & decreases blood flow. All these changes lead to atherosclerosis and an increased risk of heart disease & stroke.

Atisthaulya (obesity) is considered as one of the eight despicable conditions as described by Acharya Charaka Medas is body tissue predominant in Prithvi and Aap (jal/ water) Mahabhutas similar to Kapha Dosha. It is characterized by Snigdha (unctuous), Guru (heavy), Sthula (space occupying), Picchila (slimy), Mridu (tender/soft) and Sandra (dense) Guna (qualities). Sneha (oleation), Sweda (production of sweat), Drudhatva (compactness), and Asthipushhti (nourishment of bones) are the main function of Medodhatu. Consumption of Guru (heavy to digest), Sheeta (cold), Snigdha (unctuous), Madhuradi Kapha vardhaka (sweet and Kapha increasing) drugs along with lack of exercise and sedentary life style result in excessive nourishment of Medas while other bodily elements (Dhatus) are deprived of nourishment. Disproportionately increased Medas is accountable for several serious consequences reported in Charaka Samhita like Ayuhrasa (decrease of life span), Javoparodha (decrease in enthusiasm and activity), Krichravyavayata (difficulty in sexual act), Dourbalya (decrease of strength), Dourgandhya (bad odor), Swedabadha (excess perspiration) and Kshut Pipasadhikiya (excessive hunger and thirst). Mandotsaham (less activity referring to sedentary lifestyle), Atisnigdham (excessive intake of fatty substances), Atisthauyam (gross obesity), and Mahashanam (excessive eating) constitute for causation of Prameha (urinary diseases including Diabetes) and these etiological factors may also initiate Dyslipidemia.

Kayagni or Pachakagni (digestive fire) contributes its moieties to the Dhatu or Dhatwagni dealing with tissue metabolism. Ama (undigested toxic substance) which results from hypofunctioning of dhatvagni may clog to the Srotas (channels) leading to Srotorodha (obstruction of channels) which in turn increases Medodushti and decreases the nutrient supply to subsequent Dhatu namely Asthi (bone tissue), Majja (bone marrow), and Shukra (fertility promoting substance). Santarpanottha Vikaras (diseases due to excessive nutrition) are increasing during current times. Medodushti disorder of fat metabol-
isism serves as one of the important etiological factor in most of these disorders including ischemic heart diseases (IHD). Retention and deposition of serum lipids resulting in decreased flow of blood in coronary arteries being the underlying cause.

**Line of management and selection of drugs**

**Ayurvedic management of Metabolic Syndrome**

Obesity and Hyperlipidemia being the cause of metabolic syndrome in adolescents as well as older age groups, there is a necessity to combat them with drugs mentioned in classics which may be useful to address the associated conditions of Medodushti. Medohara drugs lekhaniya i.e mentioned in the classical texts which may abet our understanding of prevention and management of the condition like metabolic syndrome, Obesity and Dyslipidemia.

Administration of drugs possessing Tikta Rasa (bitter taste), Ushna Veerya (hot in potency), Laghu and Ruksha Guna (light and dry qualities), Katu Vipaka and Vata Kaphahara actions are useful.

Acharya Charakha has furnished six therapeutic measures (Shadupakrama), i.e., Langhana (lightening therapy), Brumhana (nourishing therapy), Rukshana (drying therapy), Snehana (oleation therapy), Swedana (fomentation therapy), and Stambhana (astringent therapy)\(^{20}\). Langhaneya Dravya (drugs causing lightness) can achieve the therapeutic effect by the dominance of Gunas like Laghu (light), Ushna (hot), Teekshna (strong), Vishada (non slimy), Ruksha (dry), Sukshma (subtle), Khara (rough), Sara and Kathina (hard). Rukshaniya drugs (causing dryness) should possess Gunas like Ruksha, Laghu, Khara, Teekshna, Ushna, Shhira, Vishada, and Kat hina\(^ {20}\) The comparison of Gunas of both the Upakramas clearly indicate that a drug possessing the Gunas namely Laghu, Ruksha, Ushna, Teekshna, Vishada, Khara, and Kathina may significantly subdue Kapha and Medodhatu Dushti in the conditions like Obesity, Hyperlipidemia, and Diabetes mellitus.

<table>
<thead>
<tr>
<th>Name of Gana</th>
<th>C.S</th>
<th>S.S</th>
<th>A.S</th>
<th>A.H</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lekhanhya Gana</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Varunadi Gana</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Shalasaradi Gana</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Lodhradi Gana</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Arkadi Gana</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Mushakadai Gana</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Nyagrodhdi Gana</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Tryushana</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Ushakadi Gana</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Asanadi Gana</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Surasadi Gana</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Vatekadi Gana</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Vachha Haridrani Gana</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>

Analysis of the herbs from medohara ganas clearly indicates that Tikta Rasa Dravyas dominates the list (59) followed by Katu (48), Kashaya (41), Madhura (33), and...
Amla (8) Rasa drugs. Tikta being Laghu and Ruksha reduces vitiation of Kapha and Medodushti along with neutralization of Amavisha through its Deepaniya, Pachaniya, and Vishaghn activities. Katu rasa exerts similar effect on Ama, Kapha, and Medodushti by its Laghu, Ushna, and Ruksha Gunas. It can provide significant Rukshaneeya effect in comparison Tikta, Kashaya Dravyas due to association with Ushna Guna. Kashaya Rasa being most Ruksha may facilitate for Shoshana (absorption) of liquefied or detoxified Kapha and Medodhatu. The Dravya possessing Tikta Rasa and Katu Rasa are to be prescribed in the initial stages (Border line of hyperlipidemia) of treatment of Dyslipidemia and Kashaya dominant drugs can be incorporated in the subsequent phases (High and very high hyperlipidemia) which facilitates for Shoshana (absorption) of liquefied or detoxified Kapha and Medodhatas, a state produced by Tikta Rasa and Katu Rasa.8

The application of Amla Rasa which is attributed with Deepana, Vatanulomana, and properties may be preferred in the last phase which subdued Vataprakopa induced by Tikta, Katu, and Kashaya Rasa drugs. Agni Mahabhatu dominant Rasa like Katu and Amla should be judiciously applied by taking into consideration the involvement of Agni, Ama, and Srotorodha to establish normal lipidemic state in the body. Drugs like Priyala (Buchanania lanzan Spreng.), Shatavari (Asparagus racemosus willd.), Yashtimadhu (Glycyrrhiza glabra Linn.), etc., possessing Madhura Rasa and Snigdha Guna may help to soften and unction the vessels hardened over-time by the deposited fat as in the case in Atherosclerosis.8

CONCLUSION

Sthaulya (Obesity) is considered the world’s oldest metabolic disorder. It is not a single disease entity but a syndrome with many causes including combination of genetic, nutritional and sociological, oxidative stress factors.

Obesity develops as a result of a complex interaction between a person’s genes and the environment characterize by disturb in metabolism long-term energy imbalance due to excessive caloric consumption, insufficient energy output (sedentary lifestyle, low resting metabolic rate) or both. Diet and life style play a significant role both in development and control of obesity. Obesity increases the likelihood of various diseases, particularly heart disease, type 2 diabetes, breathing difficulties during sleep, certain types of cancer, and osteoarthritis. Hence it is first stage of (Purvaroopa) of metabolic syndrome.

Metabolic syndrome is a cluster of conditions — increased blood pressure, a high blood sugar level, excess body fat around the waist and abnormal cholesterol levels — that occur together, increasing your risk of heart disease, stroke and diabetes. Having just one of these conditions doesn’t mean you have metabolic syndrome. However, any of these conditions increase your risk of serious disease. If more than one of these conditions occur in combination, your risk is even greater.

In brief, a detailed description regarding atisthulata (obesity/medoroga) is given in classical literature of Ayurveda, which can be correlated with the clinical conditions associated with metabolic syndrome.

Ayurveda has not described as such treatment of metabolic syndrome but there
are various pharmacologic and non-pharmacologic methods for the prevention and management of obesity. The food and drinks which alleviates *vata*, reduces *kapha* and fat should be taken. Use of *Guduchi, Musta, Triphla*, honey etc are recommended for removing obesity or excess fat. *Vidanga, Shunthi, yavakasara* ash powder of black iron mixed with honey, powder of barley and *Amalaka* is beneficial in the management of obesity. Similarly *Bilvadi pancha-mula* mixed with honey and use of *Shilajatu* along with juice of *Agnimantha* along with diet *prastika, kangu, shyamaka, yavaka, yava, green gram, kulatha, makutha, patola, amalaki* fruits can be used for reducing fat.  

**REFERENCES**

1) www.nlm.nih.gov/MssedlinePlus: Metabolic Syndrome [pub med]  
2) Digestion and metabolism in Ayurveda C.Dwarakanath, Pub. Chowkhambha Krishnadas academy, Varanasi 2010 pg 190  
3) Increased oxidative stress in obesity and its impact on metabolic syndrome J. Clin invest v 114 (12) Dec -15 2004 PMC ID 535065  
5) Susruta Samhita, Ayurveda Tattva Sandipika, Hindi Commentary by Shashti, Ambikadutta Chaukhambha Sanskrit Sansthyan Varanasi. 2001 Sushruta sutra sthana chp.15:37,  
7) Cancer, inflammation and insights from ayurveda. Venil N.Sumantran and Girish Tillu. www.hindawi.com/journals/ecam/2012/306346#B48B58  
13) Metabolic Syndrome in Ayurveda – A Critical Review Antiwal Meera, Singh J. P. Singh O.P Review Article International Ayurvedic Medical Journal ISSN:23205091  
15) Charaka Samhita, Ashtauninditeeya Adhyaya, 21/1 .:117.  
16) Chakrapanidutta. In: Commentator, Sushruta Samhita, Sutra Sthana,


18) Charaka Samhita, Pramehanidanam, 4/51.


CORRESPONDING AUTHOR
Vd. Shipra Harshavardhan Pandey
Ph.D. Scholar,
B/8 Zarina park; Opp. Anushakti nagar bus depo, ST road, Mankhurd, Mumbai
Maharashtra, India
Email: shiprahpandey@gmail.com

Source of support: Nil
Conflict of interest: None Declared