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Jamnagar, India

Souvenir

Based on

Prof. M.S. Baghel Memorial Lecture Series

[February 09, 2021 – January 09, 2022]

Edited by Dr. Gopal Basisht

Foreword by Vd. Rajesh Kotecha

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सत्यमेव जयते

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Vaidya Rajesh Kotecha

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FOREWORD

Prof. M. S. Baghel was a great visionary in the field of Ayurveda. He devoted his life for uplifting the standards of Ayurveda education and research. I remember him and pay tribute to his holy soul. He has been the founder member of the Charak Samhita New Edition Project initiated by Dr. Gopal Basisht with stalwarts of Ayurveda across India. This project is a milestone to change the views of scientists and researchers to read classical Ayurveda text to contemporary evidence-based Ayurveda on a single open-access platform. Prof. Baghel played a crucial role in establishing Charak Samhita Research, Training and Skill Development Centre in collaboration with I.P.G.T.& R.A.(now I.T.R.A.) Jamnagar. This Center is continuously involved in propagating Ayurveda across the globe. A lecture series," Prof. M.S. Baghel Memorial Lecture Series," was organized to offer tribute to the legend. It included twelve lectures delivered by experts on the topics related to challenges in the healthcare field. The editorial team and speakers have converted the video lectures into articles to enrich the research database. It is a pleasure to read this souvenir of articles based on lectures delivered by international Ayurveda experts on critical areas of Ayurveda research and education.

The critical and challenging topics for Ayurveda clinical research and education are comprehensively described in this souvenir. This publication is a quality content with a mix of experience and evidence by eminent specialists of Ayurveda. I congratulate Dr.Gopal Basisht and Dr. Anup Thakar for conducting this unique lecture series and transforming the lectures into documentary evidence. I am sure that this Souvenir will be read and referred by the learners and scholars seeking knowledge of Ayurveda as a science.

राजेश कोटेचा

(Rajesh Kotecha)

New Delhi
23rd February, 2022

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Preface

Prof. M. S. Baghel is immortal through his teachings and practical approach towards Ayurveda. He envisioned propagating Ayurveda on the global platform and devoted his life to this purpose. He played a significant role in uplifting the status of Ayurveda as a scientific evidence-based healthcare system. He has been instrumental in developing Charak Samhita New Edition on the wiki platform. This website is viewed in more than 180 countries and read by more than 15K readers per month. Prof. Baghel was the founder member and advisor of Charak Samhita Research, Training and Skill Development Centre (CSRTSDC). When he left the physical world on January 09, 2021, it was a heavy loss of all Ayurveda fraternity. The center's Advisory board decided to pay homage through a lecture series in his memories. It was decided to organize a monthly lecture on 9th day of every month till his first death anniversary.

The Prof.M.S.Baghel Memorial Lecture Series included twelve talks by eminent speakers on important healthcare topics. As Prof. Baghel was an internationally renowned personality, the experts on specific issues readily accepted the invitation. All the lectures were streamed live on the Facebook Page of the Centre. These lectures were well received by the global audience and have more than 10K views. The series was successfully completed on January 09, 2022. The video recordings were edited and posted on the YouTube channel. The team of CSRTSDC transformed these lectures into research-based documents with the help of speakers and published them online on the website for readers. A comprehensive collection of all these important articles is being published in this souvenir.

The critical and challenging topics for Ayurveda clinical research and education are elaborately described in this souvenir. We acknowledge the support of all speakers Prof.S.K. Sharma Khandel, Vaidya DilipGadgil,Prof. H. M. Chandola, Dr.Mukund Sabnis, Dr. Rohit Sane, Dr. S. H. Acharya, Dr. S.R. Narahari., Dr. Narayan Prakash, Prof. Vd. Upendra Dixit, Vaidya Ram Manohar and Prof. Dr. S.N. Gupta for their timely deliberations and expert talks. We hope this souvenir will be helpful for all learners of Ayurveda and serve the purpose of a reference manual on major challenges in the healthcare field. Ayurveda can provide a better solution in these areas, as discussed in the respective articles.

(PROF. ANUP THAKAR)
DIRECTOR

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Editorial

Prof. M. S. Baghel was a great teacher and researcher. I was impressed with his thoughtful deliberations. Being a modern physician, I was a new learner of Ayurveda. But, Prof.Baghel made the learning simplified. He encouraged me to learn fundamental principles of Ayurveda and include them in my clinical practice. We discussed many aspects of education and research in Ayurveda and healthcare. He was a key person who led me on the path for publication of Charak Samhita New Edition Project. He guided from time to time and made all his resources available for proper project implementation. Unfortunately, we lost him in mid-way. He will be remembered forever in the form of his contribution and dedication to this project.

The lecture series organized in his memory and publication of this souvenir is an effort to pay tribute to the stalwart. In the current global pandemic Covid-19, the article "Principles of management of Infectious diseases through Ayurveda" by Prof.S.K. Sharma Khandel gives insight towards empowering defense strategies to fight infectious diseases. The article on management of Cancer by Vaidya Dilip Gadgil focuses on preventing and treating malignancies through Ayurveda. The writing on the management of acid peptic diseases by Prof. H. M. Chandola provides comprehensive information about the most typical health problem.

Dr.Mukund Sabnis, a renowned expert in obesity management, has poured experience-based views in his article on the management of metabolic syndrome and obesity in Ayurveda. Another well-known cardiologist, Dr. Rohit Sane, has given precise information with published evidence on the ayurvedic management of cardiac diseases. The article on the management of neurological disorders by distinguished professor Dr. S. H. Acharya elaborates the scopes of Ayurveda services in neurology. Dr. S.R. Narahari., a dedicated researcher in dermatology, has put his experience and evidence together in writing on the management of skin diseases in integrative medicine.

Dr. Narayan Prakash covers the scope of the fast-developing research field of Ayurveda psychiatry in the article on the management of psychiatric diseases. Prof. Vd. Upendra Dixit, an eminent physician, wrote the experience-based protocols for managing medical emergencies in Ayurveda.

In the article on the management of rheumatic diseases, Vaidya Ram Manohar has narrated the fundamental concepts very nicely. Prof. Dr. S.N. Gupta, a renowned expert in managing kidney diseases, put forward his clinical practice experiences with scientific evidence. Prof. Anup Thakar precisely answers the challenges of practicing panchakarma to preserve health in the modern lifestyle in his article. We thank all speakers for their active participation and kind support. I hope this souvenir will be helpful for the learners of Ayurveda.

Dr.Gopal K.Basisht
Orlando, Florida, U.S.A.

CONTENTS

Obesity and Metabolic Syndrome

Dr. Mukund Sabnis
Director, Jeevanrekha Ayurveda Chikitsalaya
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Website link:
https://www.carakasamhitaonline.com/index.php?title=Obesity_and_Metabolic_Syndrome

Youtube link of recorded lecture: https://www.youtube.com/watch?v=LZ64oSsbBc4

Principles of Diagnosis and Management of Metabolic syndrome and Obesity in Ayurveda

This article is based on lecture delivered by Dr. Mukund Sabnis in Prof.M.S.Baghel Memorial Lecture Series on May 09, 2021.

Metabolic syndrome is a group of several cardiovascular risk factors like insulin resistance, obesity, atherogenic dyslipidemia and hypertension. These conditions are interrelated and share underlying mediators, mechanisms and pathways. There has been recent controversy about its definition and its utility. Metabolic syndrome is not an ultimate diagnosis. Metabolic syndrome is a subgroup of patients with shared pathophysiology who are at high risk of developing cardiovascular disease and type 2 diabetes. Pathophysiology and disease pathogenesis can be better understood by observing the clinical features of metabolic syndrome and their interrelation.

Ayurveda has a vast scope in the management of metabolic syndrome. Clubbing of modern medicine concepts with Ayurveda is essential for this. The pathophysiology of metabolic syndrome shall be clubbed with disorders due to overnutrition (santarpanajanya vyadhi) in Ayurveda. [Cha.Sa. Sutra Sthana 23/3-5]

Definition

Table 1. Definitions of metabolic syndrome

	NCEP ATP III (2005 revision)	WHO (1998)	EGIR (1999)	IDF (2005)
Absolutely required	None	Insulin resistance* (IGT, IFG, T2D or other evidence of IR)	Hyperinsulinemia† (plasma insulin >75th percentile)	Central obesity (waist circumference‡): ≥94 cm (M), ≥80 cm (F)
Criteria	Any three of the five criteria below	Insulin resistance or diabetes, plus two of the five criteria below	Hyperinsulinemia, plus two of the four criteria below	Obesity, plus two of the four criteria below
Obesity	Waist circumference: >40 inches (M), >35 inches (F)	Waist/hip ratio: >0.90 (M), >0.85 (F); or BMI >30 kg/m²	Waist circumference: ≥94 cm (M), ≥80cm (F)	Central obesity already required
Hyperglycemia	Fasting glucose ≥100 mg/dl or Rx	Insulin resistance already required	Insulin resistance already required	Fasting glucose ≥100 mg/dl
Dyslipidemia	TG ≥150 mg/dl or Rx	TG ≥150 mg/dl or HDL-C: <35 mg/dl (M), <39 mg/dl (F)	TG ≥177 mg/dl or HDL-C <39 mg/dl	TG ≥150 mg/dl or Rx
Dyslipidemia (second, separate criteria)	HDL cholesterol: <40 mg/dl (M), <50 mg/dl (F); or Rx			HDL cholesterol: <40 mg/dl (M), <50 mg/dl (F); or Rx
Hypertension	>130 mmHg systolic or >85 mmHg diastolic or Rx	≥140/90 mmHg	≥140/90 mmHg or Rx	>130 mmHg systolic or >85 mmHg diastolic or Rx
Other criteria		Microalbuminuria†		

*IGT, impaired glucose tolerance; IFG, impaired fasting glucose; T2D, type 2 diabetes; IR, insulin resistance; other evidence includes euglycemic clamp studies.
†Urinary albumin excretion of ≥20 μg/min or albumin-to-creatinine ratio of ≥30 mg/g.
‡Reliable only in patients without T2D.
§Criteria for central obesity (waist circumference) are specific for each population; values given are for European men and women.
Rx, pharmacologic treatment.

Figure 1: Definition of metabolic syndrome

A comprehensive definition of metabolic syndrome and its key features would facilitate research on its causes.[Fig.1][1] It can lead to new insights into pharmacological, and lifestyle treatment approaches. In metabolic diseases, only pharmacological interventions don't give results. Lifestyle management is very much essential with pharmacological interventions.

Factors in metabolic syndrome

The criteria to define 'metabolic syndrome' includes different parameters like obesity, hyperglycemia, dyslipidemia, hypertension. As per Ayurveda, all the endogenous diseases occur invariably due to the vitiation of vata, pitta and kapha. The diagnosis is made by examining location, signs and symptoms, causes of vitiation of three dosha in any condition. [Cha.Sa. Sutra Sthana 19/5]

Causes

The causes of all endogenous diseases [nija roga] can lead to metabolic diseases. [Cha. Sa.Sutra Sthana 18/6]

Following factors shall be considered while understanding diagnosis and treatment of metabolic syndrome:

- Role of digestion and metabolism (agni)
- Lifestyle (vihara), including physical activities

- Genetic factors
- Food intake, dietary factors
- Psychological factors
- Ante-natal and post-natal factors
- Iatrogenic factors
- As a complication of other diseases [Cha.Sa.Sutra Sthana 18/6]
- Disorders of Ojas [Cha.Sa.Sutra Sthana 17/76-77]

Body frames

The type of body frame of a patient with metabolic syndrome should be considered. As per Ayurveda obese (sthula), lean (krisha) and medium (madhyama) are the three types of body frames. [Su.Sa. Sutra Shtana 35/33] These are the physiological variations of body frame. As per blood parameters, a thin-built person can also be obese. They are called thin obese patients. There the patient is having adipose tissue (meda dhatu) vitiation. At the same time, an obese patient may not require any treatment because of excellent adipose tissue quality (meda sara). The management also varies according to body frames. Bringing Ayurvedic and modern concepts about metabolic syndrome can make the treatment easy.

Quality of body tissues (dhatu sarata)

Sarata means the optimum quality of body tissues. It is one of the assessment parameters to check the health of tissues. Physician may sometimes make a wrong judgement by just looking at the patient. A patient having corpulent or a big physique may not be strong or healthy. On the other hand, it is observed that some persons having small body and leanness are strong, like the tiny ants carrying a big load. This is why the optimum quality of tissues (dhatu sarata) shall be examined before understanding a patient's strength. [Cha.Sa. Vimana Sthana 8/115]

In contemporary practices, while treating metabolic syndrome, lipid profile is generally taken into account. When total cholesterol and LDL are high, it is usually considered a high-risk group. However, the oxidized state should also be considered. Unless and until the LDL is getting oxidized, it will not create any pathological conditions. The lipid profile is not an indicator of optimum quality of adipose tissue (meda sara). In Ayurvedic management of metabolic syndrome, these are fundamental concepts that should be taken to account. So as far as Ayurveda is considered, these types of investigations or criteria are very superficial and have a very limited scope in treating metabolic disorders.

Quality of tissue (sarata) and blood parameters should be assessed before treating a patient. The biomarkers used in modern medical practice are insufficient and often inappropriate to decide the patient's diagnosis, prognosis, and treatment. The same is true while applying them in diagnostic and research of Ayurveda perspectives.

In most of the researches in obesity, weight is considered as the main parameter. However, it is a very superficial parameter. Weight reduction to make the obese person thin is a primary goal in general practice. However, the most crucial concern in treating an obese person is not to make the person thin but to transform an unhealthy obese person to a healthy obese person. [Su.Sa. Sutra Sthana 35/34] If the person has adipose tissue with optimum quality (meda sara), it is challenging to reduce weight. Similarly, in hyperhomocysteinemia, one should see whether the patient is with optimal quality of blood tissue (rakta sara), before treating the person. So while treating obesity and metabolic syndrome through Ayurveda, the targets should be different, and the biomarkers should be more specific.

Selection of biomarker

The selection of biomarker depends on the type of disorder and drug used for therapy. The correct selection of biomarker sheds light on the mode of action of that particular drug. The medicines described for the treatment of obesity vary in their mode of action. The different medicines for reducing body tissues (lekhana) act differently. Some medicines work on fatty liver; some on skeletal muscles; some have insulin sensitizing action; and some have anti oxidant activities specific to the adipose tissue (meda dhatu). So depending on the underlying pathology and drug, the biomarker should be selected. If we suspect inflammatory involvement, then the best biomarker is either Adiponectin or high sensitive c reactive protein (HSCRP). Adiponectin level suggests the presence of inflammation, tendency of atherogenesis, or presence of insulin resistance at the cellular level. In different types of metabolic disorders like hypercholesterolemia, hyperhomocysteinemia etc. the specific biomarker should be selected.

Disorders due to overnutrition (santarpanajanya vyadhi)

Causes

Dietary causes

Excess intake of unctuous (snigdha), sweet (madhura), heavy to digest (guru), slimy (picchila) foods, new grains, new fermented drinks, the flesh of animals living in the marshy area or water, cow milk and its products, jaggery products, foods prepared with rice batter leads to metabolic diseases. [Cha.Sa. Sutra Sthana 23/3-4]

Lifestyle factors

Less physical activities, sleeping in the daytime, excessive indulgence in lying, sitting, and sexual activities. [Cha.Sa. Sutra Sthana 23/3-4]

Diseases involved

Obstinate urinary disorders, diabetic carbuncles, skin rashes, itching, anemia, fever, skin disorders, diseases caused by ama, dysuria, anorexia, lassitude, erectile

dysfunctions/impotency, obesity, laziness, heaviness in body, coating in body channels and sense organs, delusion, edema etc.are caused as a result of metabolic syndrome.[Cha.Sa. Sutra Sthana 23/5-7]

It should be noted that these diseases, especially anemia (pandu), obstinate skin disorders (kushtha), fever (jwara), erectile dysfunction (klaibya) are caused from overnutrition. So the underlying pathology must be understood before treatment. Even degenerative or catabolic disorders may result as a consequence of excess anabolism. For e.g.: if erectile dysfunction is caused due to obesity, treatment with vajikarana (aphrodisiac) medications won't work.

Pathology

Some of the underlying biochemical principles and pathological factors that result in anabolic disorders are not addressed while giving Ayurvedic treatment. Those are:

1. Concept of oxidative stress
2. Mitochondrial dysfunction
3. Endoplasmic reticulum (ER) stress
4. Low-grade inflammation
5. Nutrition excess
6. Malnutrition including advanced glycation end products (AGE)
7. Circadian rhythm
8. Gut Microbiota

The major Ayurvedic concepts that are responsible for the pathogenesis of metabolic disorders are as follows:

1. Digestion and metabolic processes (agni)
2. Undigested and metabolic toxins (ama)
3. Body tissue (dushya), geographical conditions (desha), general physical constitution (prakriti), time (kala), body strength (bala).
4. Food including and portion size
5. Lifestyle and exercise capacity
6. Antagonistic food (viruddha anna and malina ahara)
7. Daily and seasonal regimens (dinacharya and ritucharya)

Gut flora: This is important to consider the action of drugs. If this is not targeted, the short-chain fatty acids (SCFA) coming out of inflamed intestine get deposited in liver. It can't be stopped. The use of Curcuma longa (haridra), Andrographis paniculata (kalamegha) etc. can alter the gut flora. It can stop intestinal inflammation and prevent the deposition of SCFA into the liver.

Prognosis

All metabolic disorders require long-term treatment and are difficult to cure (kashta sadhya). If the medicines need to be given for short duration, then only phyto-pharmacology can be considered. If long-term therapy is needed as in metabolic disorders, the above-mentioned factors must be considered.

For e.g: In metabolic disorder, viruddha ahara or malina ahara (antagonistic food) is an important factor. Consumption of wine with cheese, fruit juices in early morning, milkshakes with non-vegetarian foods, non-vegetarian food with curd are antagonists (viruddha). With the help of molecular biology and biochemistry, clear explanations are available about their antagonistic effect (viruddha).

Obesity – Diagnosis and Ayurvedic management

Obesity is now increasing with age, more prevalent among lower socio-economic and lower-income groups, with a particular strong social gradient towards women. It is essential to treat Obesity, because it is a known risk factor for the following conditions:

- Type 2 Diabetes
- Coronary Heart Disease
- Metabolic Syndrome
- Cancer: especially Breast and Colon
- Psychological ill-health
- Osteoarthritis
- Hypertension

Definition

Obesity is a chronic, lifelong, genetically related, life-threatening disease with highly significant medical, psychological, social, physical, and economic co-morbidities. But unfortunately, obesity is not classified as a disease in the medical system. It is considered as the status symbol of the body.

Co-morbidities

Reduced lifespan, restricted movements, impotence or reduced sexual activities, debility, bad odor, profuse sweating, excessive hunger and thirst are the complications considered in Ayurveda for an obese person. [Cha.Sa. Sutra Sthana 21/3]

Causes

Overconsumption of heavy to digest, sweet, cold, unctuous diet are considered as the causes for obesity. This sequence is also important. Importance is given for heavy to digest and sweet substances than cold and unctuous substances. So even if a particular food item,

e.g. ice cream, is prepared as sugar-free, it is heavy to digest. So it remains to be a potential causative factor for obesity and other metabolic disorders. Unctuousness is considered as the last factor in this hierarchy. However, unfortunately, nowadays, it is the first target in the management of obesity.

Lack of physical exercise, abstinence from sexual intercourse, sleeping during the day, uninterrupted cheerfulness, lack of mental activities, and genetic defects are the other factors responsible for obesity. In western countries, genetic obesity is much more prevalent than in India.

Genetic obesity: Obesity runs in families due to genetic disorders. It may also be due to the similar eating habits of all the family members. Several genes are involved which are responsible for weight gain.

OB gene: It is a gene that prevents leptin production, a hormone released by adipose tissue. It is released in the bloodstream to inform the appetite center in the brain about the level of body fat store. When this communication system works correctly, the hypothalamic area of the brain responds to leptin by reducing appetite and speeding up metabolism to maintain a normal level of body fat. If the OB gene fails to produce leptin, the brain promotes the storage of fats resulting in obesity.

Endocrine dysfunction:

The endocrinological disorders like hypothyroidism, acromegaly and poly cystic ovarian disease can cause obesity.

Classification

Based on the fat cell characteristics

1. Mildly obese: Enlarged fat cells (hypertrophic obesity)
2. Moderately obese: Fats are larger in size and more in number
3. Severely obese: The number of fats cells are significantly increased (hyperplastic obesity)

Based on the histopathology of fat cells

1. Hyperplastic obesity: The number of fats is increased
2. Hypertropic obesity: Enlargement of fat cells happens. It is seen more in metabolic disorders.

Based on the distribution of fat

1. Generalized
2. Central (Android obesity): Involves only the trunk and neck

3. Superior: Involves face, arm, neck, and upper part of trunk
4. Inferior: Involves lower part of trunk and neck
5. Girdle type (Gynoid obesity): Involving hips, buttocks and abdomen with a fatty apron
6. Breaches of trochanteric type: Involves only the buttocks
7. Lipomatous type: Multiple lipomatosis with localized deposits of fat over the body

Pathogenesis

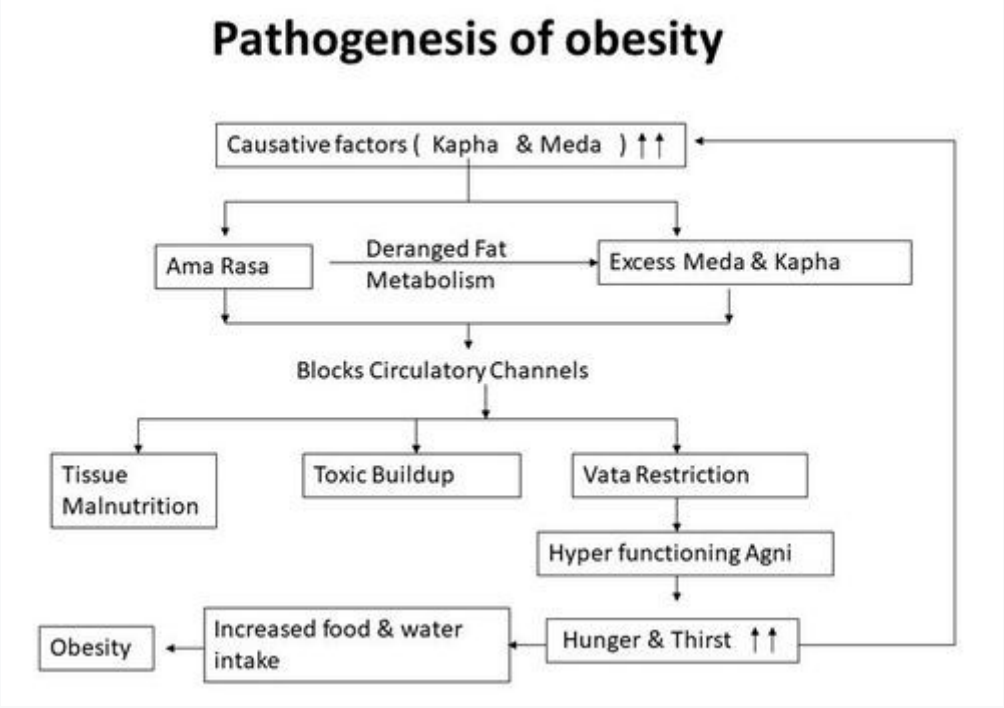

Figure 2: Pathogenesis of Obesity

Due to the causative factors, the adipose tissue (meda dhatu) only is nourished. This leads to obesity. The other tissues (dhatu) do not get nourishment. It results in laxity (shaithilya) in each body tissue. This leads to a shortening of life span. [Cha.Sa. Sutra Sthana 21/3] This laxity is also seen in obstinate urinary disorders, including diabetic mellitus (prameha).

As per the definition of obese (sthula), there is a simultaneous increase of adipose tissue (meda dhatu) and muscle tissue (mamsa dhatu). So the muscle tissue (mamsa dhatu) should also be targeted during treatment.

Due to the obstruction of body channels by adipose tissue (meda dhatu), vatadosha is trapped inside the gut (koshtha). The vatadosha continuously stimulates the agni (digestion and metabolism) and increases the demand for food. It leads to voracious appetite without the sense of satiety. [Cha.Sa.Sutra Sthana 21/5-6] This

pathogenesis can be related with strong insulin resistance at hepatic or pancreatic level or leptin resistance at hypothalamus level. These pathologies should be broken while treating obesity.

In pathogenesis of prameha, the kapha dosha and fat/adipose tissue (meda dhatu) mix with muscle (mamsa dhatu) and body fluids (kleda) which are already excessive in quantity. [Cha.Sa.Nidana Sthana 4/8] The disease prameha can be considered as a prototype for all metabolic disorders. So with meda dhatu and mamsa dhatu, kleda should also be considered in metabolic disorders. The laxity occurs due to excess accumulation of kleda in body tissues. It results in unwanted moisture or fluid (abishyandana) into body channels. This creates low-grade inflammation at cellular level. The pathogenesis is as shown in figure 2.

Role of body fluids (kleda)

Kleda is a physiological factor responsible for moisture. It is essential to properly digest food and get food assimilated into body tissues (dhatu). It is one among the factors which are responsible for the transformation of food (aharaparinamakara bhava).[Cha.Sa. Sharira Sthana 6/14] In the normal state, it eases digestion. It is retained by sweat to moisten the skin. Excess of it is excreted through urine. When vitiated, it induces laxity, oozing or dampness in body tissues and thereby decline in their functions. It liquefies the dhatu quantitatively. It is closely associated with vitiated kapha dosha and adipose tissue (meda dhatu). It can result in rotting, putrification and decomposition of body tissues. Kleda can be ascribed as an inflammation-creating factor at cellular level in body tissues. In metabolic syndrome, it creates inflammation of adipose tissue (meda dhatu). Excess kleda disturbs the microenvironment of the tissues. Vitiated kleda can result in cellular and tissue laxity, low-grade inflammation, mitochondrial dysfunction, or endoplasmic reticulum stress.

Kleda can lead to altered fluid distribution in body. It is a complication of lowered metabolism at cell level (dhatu agnimandya). The altered states include relative over hydration or cell dehydration, abnormal fluid regulation, and normal adaptation to hyperosmotic stress. These states could have different implications in obesity prevention and treatment. Therefore, kleda is an essential factor in treating obesity or any metabolic disorder.

Role of muscle tissue (mamsa dhatu)

Muscle tissue (mamsa dhatu) is one of the vitiated factors (dushya) in obstinate urinary disorders including diabetes mellitus (prameha). The sequence of the pathology of prameha points to vitiation of adipose tissue (meda dhatu)at first. This meda dhatu infiltrates muscle tissue (mamsa dhatu). Mamsa dhatu is vitiated in prameha due to excess kapha and obstruction of body channels (avaranajanaya prameha). This indicates

that smooth muscles and skeletal muscles are affected in prameha. Fatty infiltration in skeletal muscles and oxidized lipid deposition in the endothelial layer of arteries is the primary pathology observed in muscles. This pathology develops strong insulin resistance at the skeletal muscle level. This creates more hunger pains and increases food intake. This pathology can be compared with hyperfunctioning of agni due to trapped [[vata]dosha as mentioned earlier.

The application of powder massage (udvartana) in disorders due to overnutrition (santarpanajanya vyadhi) can be justified at this juncture. Udvartana acts directly on the skeletal muscles and embedded arteries. It can probably remove the fatty infiltrations and reverse the disease pathophysiology.

Consequences of obesity

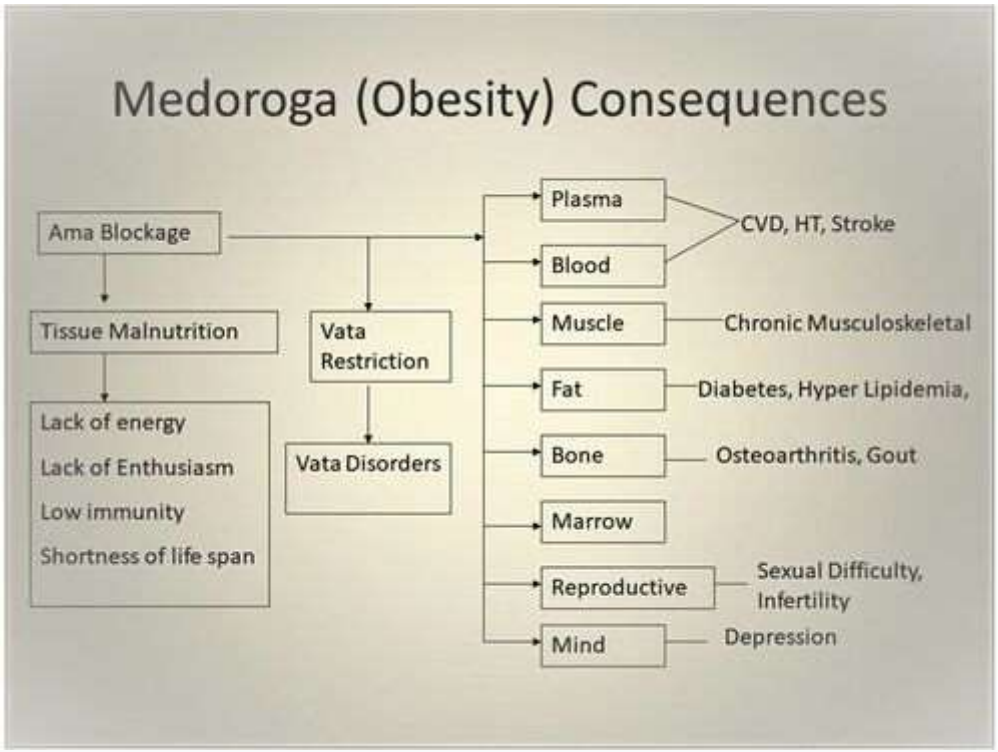

Figure 3: Complications of Obesity

Obesity can lead to many complications and comorbid conditions as shown in figure 3.

Principles of management

Breaking the chain of pathogenesis is the treatment. Merely weight reduction do not indicate management of obesity. It is an outcome of obesity management. The focus of treatment should be to provide nutrition to other tissues (dhatu). Improvement in the functioning of agni at each level is of prime importance in treating the metabolic disorder.

Ayurvedic treatments are highly personalized. One medicine does not suit all. While treating obesity, the different underlying causes such as oxidation, insulin resistance, leptin resistance, fatty liver, PCOS, drug-induced obesity etc. should be considered. These pathologies should be targeted instead of targeting the fats. Obesity and its complications should be targeted in single management. As far as possible, metallic preparation should not be used for obesity management. There are no confirmatory research works or evidence to show it is safe to use. Intake of ghee is not advised in this condition. Instead of ghee, sesame oil is used for the management of obesity and metabolic disorders.

The following principles are applied in the management of metabolic syndrome and obesity.

1. Controlling the cause (hetu)
2. Correcting the obstruction in channels (srotorodha)
3. Correcting poor metabolism (ama) status
4. Correcting digestion (agni) at every level
5. Correcting nutritious status of all other dhatu (tissues) other than meda (fats)
6. Keeping all the body channles (srotas) intact for proper nourishment of dhatu
7. Rejuvenation (rasayana)

This pharmaco-therapeutics is focused on correcting the following pathologies:

1. Oxidative stress
2. Mitochondrial dysfunction
3. Inflammation at cellular level (low-grade inflammation)
4. Gut flora
5. Appetite control system
6. Nutrition

Management therapies

1. External purification (bahya samshodhana): Powder massage (udavartana), sitz bath (avagaha), Oil dripping or decoction on the body (parisheka), application of paste, powder (lepana).

1. Internal purification therapies (abhyantara samshodhana): Therapeutic emesis (vamana), purgation (virechana), nasal administration (nasya), therapeutic decoction enema (niruha basti)

Dietary management

Avoiding heavy to digest foods:

In obesity and metabolic disorders, heavy-to-digest foods (guru ahara) are the important causative factor. As per Ayurveda, many commonly used fruits such as watermelon are heavy in nature. Gut flora is disturbed by metabolic disorders and obesity. When body mass index (BMI) exceeds 27, changes in the gut flora are more observed. Firmicutes bacteria increase in the gut, which acts over the undigested heavy food items and convert it into methyl alcohol. From the gut, it is carried to the liver and thus produces fatty liver. So the heavy-to-digest food items should be strictly avoided in metabolic disorders.

In fatty liver, in the first stage, insulin resistance is observed at the hepatocytes. There is a reduction in fatty oxidation; increase in fatty acid influx into liver; increased lipogenesis and increased triglycerides. The second stage is lipid peroxidation. So the management should target lipid peroxidation, TNF-alpha, cytokine cascade, reducing the liquid/slimy content (kleda), correcting the metabolism (agni) etc.

Ayurvedic interventions considerably control the hormones - adiponectin and leptin secreted by adipose tissue. The treatment creates insulin sensitivity and reduces inflammation at adipocyte level. Adiponectin is inversely proportional to obesity. If weight is more, adiponectin level is less and vice versa. However, in people having optimum meda dhatu (meda sara), adiponectin level increases with weight.

Effect of therapeutic enema (basti) as a treatment in obesity

Therapeutic enema with weight-reducing drugs (lekhana basti) has very important role in correcting the gut flora and reducing inflammation at the intestinal level. Short-chain fatty acids, which are created by the firmicutes bacteria, are transformed from the intestines to the liver. The action of basti may not be evident in 10 or 20 days. However, in due course of time, hormonal changes happen. The hormones like Ghrelin, GLP-1, GLP-2, GIP etc. can be used as biomarkers for the same.

Management of erectile dysfunction (klaibya or kruchhra vyavaya)

Erectile dysfunction is commonly observed in obese male patients as complication. Insulin resistance is the emerging risk factor in metabolic syndrome. Obesity and sedentary lifestyle are the risk factors for erectile dysfunction. These are also the risk factors for endothelial dysfunction. As the penile artery is obstructed due to fat deposition, the lumen of the artery gets reduced. This finally results in erectile dysfunction. This narrowing may happen in coronary arteries, resulting in cardiovascular diseases. In such a condition aphrodisiac (vajikarana) treatment won't work. In such conditions, the drugs selected should have the property of secreting nitric oxide. This dilates the occluded arteries and thus corrects the pathology. E.g.: Garlic (lashuna) is one of the ideal drugs for treating such conditions.

Conclusion

In the treatment of metabolic disorders and obesity, primarily the cause must be avoided. The causes like heavy, cold, slimy foods items should be avoided. A sedentary lifestyle must be corrected. The obstruction in the body channels, accumulation of toxic metabolic wastes (ama) and digestion and metabolism (agni) must be corrected at multiple levels. Correcting the nutritional status of all other dhatu except adipose tissue (meda), keeping all the pathways intact for the proper nourishment of body tissues, and rasayana should be done. In other words, management of metabolic disorders and obesity includes correcting oxidative stress, mitochondrial dysfunction, low-grade inflammation, gut flora, appetite control system, and nutrition. By strict dietary restrictions and lifestyle modifications, this condition can be controlled.

Interactions

Q. (Dr. Jayprakash Ram): Do the lipid levels change as per individual. How to assess what is normal value for an individual?.

A: Yes.The lipid levels changes as per individuals. The lipid levels also changes with age, desha (geographical conditions/body constitution) and prakriti (doshic constitution). The normal values cannot be generalized. It has to be correlated with the optimum quality (sarata) of tissues. If the lipids levels are deranged, further investigations like insulin resistance, HSCRP, homocysteine etc. can be done. If these investigations are normal, the abnormal lipids values should be considered as normal to that particular individual.

Q. (Dr. Yogesh Deole) Please enlighten on the role of bhutagni (agni at the level of panchamahabhuta) in obesity. How to assess it clinically?

A: Bhutagni works like a vehicle. Bhutagni carries the fuel (food) to the tissues (dhatu). The fuel is filled in a vehicle (body gut) only when it is empty (hungry state). If we overfill the tank (gut) beyond its capacity, it leads to engine dysfunction (agni vaishamya). Likewise, when there is excess body fluid (kleda) formation, aap bhutagni becomes less. In this condition, the diet control and medicines advised should work on aap mahabhutaagni. The water intake must be restricted. The astringent medicines should be given as they have kledashoshana (drying) and stambhana (obstructing) property.

Reference

1. Paul L. Huang.A comprehensive definition for metabolic syndrome. Dis Model Mech. 2009 May-Jun; 2(5-6): 231–237.doi: 10.1242/dmm.001180