



IJAPC

Volume 11 Issue 2,
2019

www.ijapc.com

2350-0204

GREENTREE GROUP PUBLISHERS



Analytic Review of *Medadhatu* and Metabolic Syndrome

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ABSTRACT

Metabolic syndrome (MS) is the term designated for a group of risk factors that raises risk for cardiac disease and other health problems, such as diabetes and stroke. The five conditions described are metabolic risk factors- abdominal obesity, High Triglycerides, High LDL, low HDL, High Blood Pressure and High fasting blood sugar; existence of any three metabolic risk factors frames a diagnosis of metabolic syndrome. The risk of getting metabolic syndrome is in conjunction to being overweight and obese and lifestyle devoid of physical activity. It is achievable to forestall or delay metabolic syndrome, mainly with lifestyle modifications. In Ayurveda, MS can be reflected as *medadhatudushtijanyavikara* or *medoroga*. As, above mentioned conditions of MS are mainly caused by the vitiated *medadhatu*. Hence, this study aims to emphasise the role of *medadhatu* in development and management of MS.

KEYWORDS

Metabolic syndrome, Medadhatu, Medoroga



Greentree Group Publishers

Received 25/07/19 Accepted 21/08/19 Published 10/09/19



INTRODUCTION

“*Dosha Dhatu Mala Mulam Hi Shariram*” states *vataditridosha*, *saptadhatu* and *trimala* are the building blocks of *sharira*. Equilibrium of *Dosha*, *Dhatu* and *Mala* is required for proper functioning of human body. *Dhatu* is one among the three fundamental entities, namely *Dosha*, *Dhatu* and *Mala*, which are required for the sustenance of *Shareera*¹. It performs the business of *Dharana* (structural framework) and *Poshana Karma* (nutritional pool). The seven *dhatu*s are the seven tissues of the body. they are *rasa* (plasma), *rakta* (blood), *mamsa* (muscle), *meda* (fat), *asthi* (bone), *majja* (marrow/nerve), and *shukra* (reproductive system) respectively. These are the structures that compose the body. They are fundamental to appreciate the association of the tissues in the body, and they are stations where *doshas* enter when they cause imbalance. *Medadhatu* is fourth amongst seven. *Medadhatu* is a *sneha* dominant *dravya* which is having *guru*, *snigdha* characteristics and predominance of *prithvi*, *apa*, *tejamahabhuta*. As stated by different *acharyas*, *snehana*, *sweda*, *dridhatwa* (strength), *asthipushti* (strengthening of bones) and *netra-gatrasnigdhatu* (oiliness of eyes and body) are the prime functions of *medadhatu*. *Chakrapani* has categorized all

the *Dhatu*s into two variants on the evidence of their function of *Poshana karma*, accordingly there are two variants of *Meda Dhatu*- one is *Poshaka* and second is *Poshya*. Amid these two variants *Poshaka Meda Dhatu* is of mobile nature (*Gatiyukta*); which circulates in whole body through *strotansi* with the *poshaka* (*Gatiyukta*) *Rasa - Rakta Dhatu*; to provide nutrition to *Poshya Medadhatu*. Although it is seen by blood investigation that cholesterol and other lipoproteins are there in circulating blood. Second *Poshya* or *sthayi Meda Dhatu* is immobile (*Gativivrajita*); which is located in *Meda Dharakala*. This *sthayi Medadhatu* can be correlated with adipose tissues/fat. The location of *Medodharakala* is Abdomen (*Udara*) and small bones (*AnuAsthi*). The depots of *Poshya Meda* are *Udara*, *Sphik* and *Stana*². It is also seen that central abdominal fat and visceral fat are metabolically more important than other fat depots being firmly linked with insulin resistance and Dyslipidemia³.

Adipose tissue dysfunction and Insulin resistance both are considered potential risk factors for occurrence of metabolic syndrome which are also considered to be symptoms of *Medoroga* in Ayurveda. The Metabolic Syndrome includes multiple components which are result of defective



metabolism and enhances the risk of Coronary Artery diseases (CAD) and Diabetes Mellitus (DM)⁴. The pathological process of MS is complex but central obesity seems to be a prime factor to develop MS. It is a major health hazard in the developed countries and gradually accruing its place in developing countries too, which leads to other hazardous complications such as CAD, CKD, NAFLD and PCOD etc⁵. The main components of MS include high blood pressure, raised triglyceride levels, increased blood glucose levels, central obesity and reduced high density lipoprotein (HDL)⁶. The unhealthy and high caloric diet accompanied with sedentary life style causes central obesity⁷. The central obesity increases the likelihood of insulin resistance by the release of abundant FFA in the circulation which occupies insulin receptors and causes Pre diabetic or hyperglycemic state which in

turn leads to metabolic syndrome⁸. If the stage of pre diabetic or full-fledged diabetes is not paid attention, condition of metabolic syndrome may emerge⁹. Over duration, if not treated, this condition of MS may transform in to other major and perilous cardio vascular and other complications¹⁰. Hence, an effort has been made to establish a relationship between *medadhatudushti* and MS.

MATERIAL AND METHODS

This article is based on a review of *Ayurveda* scriptures and text books related to the subject. The main basic *Ayurveda* texts *Charaka Samhita*, *Sushruta Samhita*, *Ashtanga Sangraha*, *Madhava Nidana* and available commentaries on these are used for review.

MEDA DHATU DUSHTI - KEY FACTOR IN PATHOGENESIS OF METABOLIC SYNDROME [Table-1] ETIOLOGY

Table 1 Nidana of *MedaDhatuDushti* and Metabolic Syndrome

S.No.	<i>Medadhatudushtinidan</i>	Causes of MS
1.	<i>Kapha Prakopaka</i> factors like <i>diwaswapna</i> , <i>avyayama</i> , <i>alasya</i> , consuming food predominant of <i>madhura-amlalavana-sheeta-snigdha-guru-picchila-abhishyandi</i> , <i>hayanaka</i> , <i>yavaka</i> , <i>naishadha</i> , <i>itkata</i> , <i>masha</i> , <i>mahamasha</i> , <i>godhuma</i> , <i>tila</i> , <i>pishta</i> , <i>dadhi</i> , <i>dugdha</i> , <i>krushara</i> , <i>payasa</i> , <i>ikshu</i> products, <i>anupa-udakamamsa</i> , <i>vasa</i> , <i>samashana</i> , <i>adhyashana</i> lead to the vitiation of <i>kaphadosha</i> , thereby vitiates <i>medadhatu</i> due to <i>ashrayashrayi bhava sambandha</i> . ¹¹	Unhealthy lifestyle – eating a diet high in unhealthy processed foods, over-eating, binge eating.
2.	The factors causing <i>medavahasrotodusti</i> are <i>avyayama</i> , <i>diwaswapna</i> , <i>medadikya mamsabhakshana</i> , <i>varuni atisevana</i> ¹² . These will lead to the vitiation of <i>medadhatu</i> .	Lack of exercise, sedentary lifestyle, processed meat and over consumption of alcohol.
3.	<i>AtiSthoulya</i> causative factors like <i>atisampooranaat</i> (eating excess quantity food), consuming food which are <i>guru</i> , <i>madhura</i> , <i>sheeta</i> ,	Factors causing central obesity and insulin resistance. As



<i>snigdha, vyayama, avyavaya, diwaswapna, harsha nityatvaat</i> (remain stress free always), <i>Achintana, Beeja Swabhava</i> ¹³ .	dysfunctional adipose tissue plays an important role in the pathogenesis of obesity related insulin resistance ¹⁴
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SIGNS & SYMPTOMS [Table 2]

Table 2 *Lakshana* of *MedaDhatuDushti* and Metabolic Syndrome

s. no	<i>Medadushti</i>	MS
1.	Cardinal sign of <i>medoroga</i> is <i>chala –sphika- udara- stana</i> (pendulous movement of buttocks, abdomen, and breast.) The <i>Medodharakala</i> resides in Abdomen (<i>Udara</i>) and small bones (<i>AnuAsthi</i>). The depots of <i>PoshyaMeda</i> are <i>Udara, Sphik, Stana</i> . So, <i>medadhatudushti</i> results in <i>udaravidhi</i> (central obesity). <i>Acharya charaka</i> emphasised that serious diseases (<i>darunvikar</i>) arise when fat blocks channels.	<ul style="list-style-type: none"> • A large waistline. This also is known as abdominal or android obesity i.e. "having an apple shape." Excess fat in the stomach area is a greater risk factor for heart disease than excess fat in other parts of the body, such as on the hips¹⁵.
2.	<i>Abaddhameda</i> or <i>poshakamedadhatu</i> is ambulatory and circulates in the body together with the blood in the form of lipids (cholesterol, TG, LDL, HDL, VLDL). It has been observed that individuals having <i>pravara medasara</i> means having optimum essence of <i>medadhatu</i> have high levels of HDL and reduced level of LDL ¹⁶ . Whereas in <i>medoroga</i> , reduced levels of HDL and increased levels of LDL are observed. <i>MedaDushtiJanya</i> Sign & Symptoms shows striking resemblance with Hyperlipidemia mentioned in modern text ¹⁷ .	<ul style="list-style-type: none"> • A raised triglyceride level (or individual is on medicine to treat high triglycerides). Triglycerides are a form of fat found in the blood¹⁵. • A low HDL cholesterol level (or on medicine to treat low HDL cholesterol). HDL is also known as "good" cholesterol. As it helps take away cholesterol from your arteries. A reduced HDL cholesterol level raises your risk for cardiovascular disease¹⁵.
3.	As the causative factors for <i>medodhatudushti</i> & <i>Kapha</i> vitiation are nearly similar, vitiated <i>kaphadosha</i> can lead to a condition <i>Dhamani pratichaya</i> ¹⁷ (pathological condition of medium and large walled arteries) and its association with vitiated <i>medadhatu</i> may result in <i>vyana bala vaishamy</i> (hypertension). Hypertension can develop as a chronic complication or associated condition with obesity. Eventually it creates all conditions of <i>medoroga</i> with <i>vyanabala vaishamy</i> which simulates with metabolic syndrome.	<ul style="list-style-type: none"> • High blood pressure (or on medicine to cure high blood pressure). Hypertension for long duration can damage heart and lead to plaque buildup¹⁵.
4.	<i>Meda</i> is the main element (<i>Dushya</i>) affected in <i>Sthaulya</i> and <i>Prameha</i> whereas Obesity and diabetes are mostly linked with abnormal lipid levels. Due to <i>nidanasevana</i> , the <i>kapha</i> gets vitiated and transformed into <i>bahu, dravasleshma</i> which in turn hampers the <i>visargakarma</i> of <i>kapha</i> and simultaneously vitiates <i>meda</i> causing it to remain in <i>bahu</i> and <i>abaddha</i> state. This whole concept can be interpreted as <i>kapha</i> being the free and soluble glucose abundantly found in blood in case of impaired glucose metabolism leading to hyperglycemia and <i>medadhatu</i> may be equated to free fatty acids in blood because of increased lipolytic rate in diabetes.	<ul style="list-style-type: none"> • High fasting blood sugar (or on medicine to treat high blood sugar). Slightly high blood sugar may be an early sign of diabetes¹⁵.



MANAGEMENT

Table 3 Chikitsa of *MedaDhatu Dushti* and Metabolic Syndrome

S.N	MEDOROGA OR MEDA DUSHTI	MS
O.		
1.	<p>The principle treatment of <i>medoroga</i> is</p> <ul style="list-style-type: none">• <i>Nidanaparivarjana</i>s “To avoid the causative factors”. Excess intake of carbohydrate and fat leads to abnormal visceral adiposity, which initiates cytokines-mediated pro-inflammatory process and causes excess formation of FFAs, which occupies the insulin receptors and in turn leads to Insulin resistance and other defective metabolism. Hence, <i>Snigdha</i> (oily), <i>Guru</i> (heavy), <i>Pichhila</i> (unctuous) <i>Ahara</i>, <i>Madyapana</i> (alcohol intake) as well as <i>Ati</i>asan (over eating behaviour), <i>Avayayam</i> (Sedentary lifestyles) etc. needs to be avoided by the individuals suffering from metabolic syndrome.• Administration of <i>apatarpanachikitsa</i> (depleting therapy), modified <i>ahara-vihara</i> and drugs which can pacify <i>vata-kaphadosha</i> and <i>medadhatu</i> (fatty lipids).	<p>The primary management of metabolic syndrome involves lifestyle modifications, including rectifications in diet and exercise habits¹⁸.</p>

DISCUSSION

The disease *Medoroga* was identified in *Ayurveda* as a serious health problem. A *sthulapurusha* (obese) has been described as *Atinindita* or worst despicable personality since ancient time and over eating with decreased energy expenditure as well as genetic predisposition as primary etiological factors for *medoroga*. The consumption of *sleshmalaahara* and *diwaswapana* without adequate physical activities lead to incomplete processing of *anna rasa* and it is converted into *amadasha* which is selectively converted to *medadhatu* owing to the principle of homogeneity by passing the initial two *dhatu*s. Thus, *meda* increase and accumulates to enormous amount in the body causing obesity. Obesity

accompanying insulin resistance leads to development of MS. In various studies, it has been found that android or abdominal obesity has more association with an atherogenic lipid profile, diabetes mellitus and hypertension. All these are risk factors of MS. In *ayurvedic* texts too, central obesity has been targeted from its cardinal sign “*chala- sphika- udara- stana*” (pendulous movement of buttocks, abdomen and breast). Its various clinical features, etiology and management correlate well with those of MS. Hence, it is proposed that MS and *Medoroga* can be considered to be similar disease entity.

CONCLUSION

Medodushti or *medoroga* as described in *Ayurveda* texts might be regarded as the



constant manifestation of metabolic syndrome in modern medicine on the rationale of etiological factors and their clinical manifestations. *Medadhatudushti* is the principal factor in pathogenesis of MS. Both *Baddhameda* and *abadhameda* get vitiated in MS. *Baddhameda* is the fat that is immobile and is stored at fat depots/ muscle and omentum/adipose tissue, its *dushti* leads to central obesity which in turn results into insulin resistance and hyperglycemia, both playing crucial role in the development of MS. Whereas *Abaddhameda* is the fat that is mobile and flows with the circulating blood in the form of cholesterol, TG, HDL, LDL & VLDL, *abaddhamedadushti* leads to deranged lipid values causing increase in LDL and reduction in HDL value, which is an another contributing factor in development of MS and further vitiation of *abaddhameda* may result in cardiovascular disorders (*vatavikara*) as mentioned by *acharyasushruta* in complication of *sthaulya* or *medoroga*¹⁹.

SOURCE OF SUPPORT: Nil



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