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DIFFERENCES BETWEEN MEDA AND VASA: AN ANALYSIS

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ABSTRACT

In ayurvedic science *meda* is considered as the fourth *dhatu* among the *saptadhatus* while *vasa* are considered as the *upadhatu* of *mamsa dhatu*. The accumulation of *medo dhatu* results in *sthoulya.* As *vasa* is the *upadhatu* of *mamsa dhatu* and is structurally very similar to *medo dhatu*it is posing a difficulty in the treatment of *sthoulya*. So, in this article a critical observation of *meda* and *vasa* from the Ayurveda and modern physiology is done to differentiate *meda* and *vasa*.

KEY WORDS

Meda , vasa, sthoulya, baddhameda, abaddhameda, adipose tissue

INTRODUCTION

Ayurveda biology is essentially rallied upon *dosha, dhatu and mala*. *Doshas* are the functional units, whereas *dhatus* are the structural units of human physiology. *Mala* are biological wastes that are to be eliminated timely. Balanced and imbalanced state of the three is known as health and disease respectively.*Dhatus* are seven in number the fourth being *Meda. Upadhatu* are the by-products of *dhatu* metabolism and *Vasa* is stated to be *upadhatu* of *mamsa dhatu*.

Obesity has become a global pandemic. Obesity is a condition wherein *Meda* is getting accumulated. All acharyas of Ayurveda have specifically targeted *meda dhatu* in *sthoulyachikitsa*. However, *Vasa* also is structurally very similar to *meda*. As it is *upadhatu* of *mamsa* it poses difficulty in treatment of *sthoula.*Conceptually both *meda* and *vasa* are different, however structurally when viewed from the physiology of modern medical science, there is a lot of similarity. Hence there is a need to clearly establish the differences between the two both from Ayurveda and modern physiology.

MEDO DHATU

UTPATHI OF MEDO DHATU

*Meda dhatu*is fourth *dhatu* among seven. It gets generated in intra uterine life. Growth and nourishment are by food just like any other *dhatu.* When*mamsa dhatu* takes its origin in *mamsavahasrotas,mamsadhatwagni* acts on its nutrients coming from *ahararasa* and *rakthavahasrotas*.*Mamsa dhatu* is produced in *mamsavahasrotas*.Part of *mamsa dhatu* reaches next srotasie*medovahasrotas*.It take part in the production of *medadhatu*.Nutrients coming from the *ahararasa* and from *mamsavahasrotas* are acted upon by *medhodhatwagni* and give rise to *meda dhatu*proper.From this *meda dhatu* its *upadhatu* and its *mala* gets produced.*Meda dhatu* is fluidy*dhathu* as it is extremely unctuous and only *mahabhuta* unctuous in property is *apamahabhuta*.From*parthivamamsadhatu* to produce fluidy*medodhatuapamahabhuta* with its converting power or *ushma* is needed.Thisapa brings with it its unctuous property.It this property is intensified by*teja* unctuous *meda dhatu* is produced[1].Parasara opines that the food becomes *meda*on 5 thday.Panchabouthika

structure of *medodhatu* is predominant in *prithwi* and *jala*.*Moolasthana* of *medovahasrotas* are organs like kidney and omentum where *medodhatu* is concerned[2].*Medodhara kala* is present in long and small *asthis*.The*medas* which is said to be present in small *asthis*is called *sarakthamedas*(red bone marrow).

TYPES OF MEDO DHATU

There are two types of *medadhatu*. First is *baddhameda* or *poshyameda dhatu* which have immobile nature which is stored in *medodhara kala.* The site of *medhodara kala* is *udara* and *anuasthi,udarasphikstana,gala* are also depots of *poshya meda*.[3] And second is *abaddhameda* or *poshakameda dhatu*which have mobile in nature,which is circulated in the whole body along with *rasa rakta dhatu* to give nutrition to *poshyameda dhatu.*[4]

FUNCTIONS OF MEDO DHATU

Snehana (oiliness), *sweda* (perspiration),*asthi Pushti* (bone nourishment), *dridhatwa* (consistency), *netra and gatrasnigdhata*(oiliness in whole body).[5]

MEDOVAHA SROTAS[6]

Medovahasrotas are channels through which the *poshaka* or the unstable *medadhatu* circulate in the whole body mixed with *rasa* and *rakta,* thereby nourishing the *sthayimedadhatu*. Moola of *medovahasrotas* are *vrikka*and *vapavahana*according to acharya charaka and according to acharya susruta*vrikka* and *kati.*

UPADHATU OF MEDO DHATU

*Snayu*is the *upadhatu* of *meda.*

MALA OF MEDA

Sweda (sweat) is the *mala* of the *medo dhatu.*

CONCEPT OF MEDO DHATU

In Ayurveda *meda dhatu* have been shown to affect the homeostatic functions of body. The role of *medodhatu*as maintenance of energy homeostasis and metabolism,since the *medavridhi* results in the manifestation of obesity and prodromal symptoms of *prameha.*While hypofunctional state results in emaciation especially in abdomen and flank

region, affect the functioning of bone as its hyperfunctional state results in the *asthikshaya* ,maintenance of cardiovascular functioning and nomal thermogenesis as hyperfunctional leads to cardiovascular disturbance and excess sweating.The*moolasthana*of *medovahasrotas* is considered as *vrikka*and *vapavahana* by acharya charaka.*Vrikka* is one of the *koshtanga* formed by the *sara* of *raktha* and *medodhatu*.According to dalhana commentator of susruthasamhitha stated that *vrikka* looks like *mamsapinda* and are two in number.Acharyasharangadhara stated that *vrikka*nourishes the *meda dhatu* of *jatharapradesha*.The upper part of the kidney ie supra renal gland which control the secretion of epinephrine and non-epinephrine hormones actively participates in the breakdown process of the triglycerides. Kidney does not filter the lipids.Kidney protects the lipids but the fact that filtration of fat does not occur and protections of lipids through kidney enhances fat in the body. This type of action is not seen with protein and carbohydrate.They are filtered and absorbed. Kidney is set to give special importance to lipids. The abnormal *meda* when deposited into subcutaneous tissue it gives the clinical presentation of obesity and when the *abadhameda* extracted to *basti* it creates manifestation of *prameha*. And when this *meda* is unnaturally deposited in the arterial wall and increase the peripheral resistance it shows clinical manifestation like hypertension. Ayurvedic scholars have mentioned distribution of *meda* in different parts of the body with different names. When it is present in small bones and abdomen ie around viscera is called as *meda*(visceral fat) while intermuscular fat is termed as *vasa* (muscle fat). In ayurveda*meda*is considered as a *dhatu* while *vasa* as *upadhatu*. They have not only identified different anatomical distribution but difference in their composition, quantity, functions and role in manifestation of different diseases, treatment modalities.

VASA

Shudhamamsasyayaha Sneha sa vasa parikeerthithah[7]

This is the only substance derived from *mamsa.* It represents the fat that fills up muscle spaces and support various structures like blood vessels and nerves etc..*Vasa* is considered as the *upadhatu* of *mamsa dhatu.Upadhatus* are by-products of the *dhatu* metabolism but they cannot be considered as the *malas* because *upadhaths* are nourished by the *prasadaja*part of the *dhatu*.*Upadhatus* are nourished from the *sukshmaprasadaja* part of

dhatu, which also nourishes the subsequent *dhatu*. The *pramana* of *vasa upadhatu* is mentioned as 3 anjali.[8]*Vasa* is distinctly involved in *prameha*, it is one among the *dushyas* of *prameha*. *Vasa* is different from *meda dhatu* on site of presence and mode of production.

DIFFERENCE BETWEEN MEDA AND VASA

	MEDA	***VASA***
Description	*Dhatu*	upadhatu
***Panchaboutika* composition**	*Jala and prithwi*	Not described
Sites	Cavity of small bones and abdomen, red bone marrow	Sneha or unctuousness of muscle
Types	Deposited fat(*badha)* and circulating lipid (*abadhameda)*	-
Quantity	2 *anjali*	3 *anjali*
Functions	Provides unctuousness, sweat stability and nourishment of bones.	-
Role in organogenesis	*Raktha* along with *meda* forms kidney while *mamsa, raktha, meda* and *kapha* together form testis.	

MEDA AND VASA IN CONTEMPORARY CONTEXT

In the contemporary description we can take the *meda* as visceral white adipose tissue (VWAT) which is seen around the omentum, intestines and perineal areas accounting for 10 percent of total adiposities of body.

It can also be taken as brown adipose tissue which is seen in the cervical, axillary, interscapular and supraclavicular region.

Vasa can be taken as the subcutaneous white adipose tissue which are seen in buttocks, thighs, abdomen accounting for 85 percent of total adipocytes of body.

Subcutaneous and visceral adipose tissues are responsible for distinguished metabolic consequences by secreting adipokinines. For example visceral adipose tissue plays important role in manifestation of chronic low grade inflammation by secreting lower amount of beneficial adiponectin and higher level of pro inflammatory factors. Due to this they are regarded as bad adipose tissue. They are more metabolically active and show decreased lipolysis in response to catecholamine and decreased lipolysis in response to insulin andalpha 2 adrenergic. These adipose tissues behave in a distinct way to the various influencing factors. For example, central fat is increased by excess cortisol while subcutaneous fat is reduced by growth hormone, thyroid and oestradiol increases brown fat adipogenesis while testosterone and cortisol reduce the differentiation of brown fat. Similar observations have documented in Ayurveda that separate factors have been described. Factors vitiating *medovahasrotas* are lack of exercise, excessive day sleep, excessive intake of fatty things and alcohol.[8]

Dhatus are nourished by *aahara rasa* and their nourishment is affected by both qualitative and quantitative state of *rasa dhathu* and previous *dhathu. Medadhathu* and *vasa* get nourished by *mamsadhathu .* This description of tissue nourishment may be understood by a common progenitor origin of myocytes and adipocytes. Common mesenchymal cells have 2 precursors that is lateral and paraxial mesoderm, from lateral mesoderm white adipose tissues are derived while from the paraxial mesoderm myocytes and brown adipocytes are derived. During fetal and neonatal period development of skeletal muscles occur through mesenchymal stem cells which entail three competitive processes in myogenesis, adipogenesis and fibrogenesis.

Conditions like maternal obesity may shift differentiation of mesenchymal stem cells from myogenesis towards adipogenesis and fibrogenesis results in reduced number of muscle fibre and increase intramuscular fat. Skeletal muscle plays a significant role in regulating fatty acid and glucose metabolism, thusany deviation in development of skeletal muscle during intra uterine life will cause disturbance in fat metabolism making the offspring more susceptible for type 2 diabetes mellitus and obesity. Recent studies have reported

secretions of common adipo myokines which forms adipose muscle axis and modulates energy homeostasis in the body. Myokines released by contracting muscle have beneficial effect on glucose and lipid metabolism by enhancing glucose uptake and lipolysis. They also exert systemic effect on liver and white adipose tissue by regulating glucose and lipid metabolism.

DISCUSSION

After analysis of various description related to patho physiology in Ayurveda, the role of *medo dhatu* can be summarized as maintenance of energy homeostasis and metabolism since the *medavridhi* results in manifestation of obesity and prodromal symptoms of *prameha*while hypofunctional state results inemaciation especially in abdomen and flank region, affects the functioning of bone etc. vasa will provide support to the visceral organs.

	VWAT	**MEDA**	**VASA**
Site	Omentum, intestines, Perineal areas	Yellowish greasy soft spongy layer under the skin (*udara, anuasthi*)	
Functions	Metabolic functions, glucose lipid metabolism, regulate body weight, cogulation etc…	*Snehana, dhardya* (energy homeostasis and formation of sweat), *asthi Pushti, netra and gatrasnigdhata*.	Lubricating agency placed for smooth functioning of muscle
Pathology produced	Increase blood glucose level will result in the synthesis and storage of fat in white adipose tissue.	*Medovridhi* will results in the prodromal features of *prameha* and *sthoulya*.	Distinctly involved in the formation of *prameha*.

CONCLUSION

Ayurveda considered *meda*as *dhatu* and *vasa* as *upadhatu*. And their increase or decrease of quantity may create diseases.Ayurvedic scholors have deep insight regarding nutrition and metabolism of these tissues, as they have described about their

constituents,functions,distribution etc.*Upadhatus* are basically nourished from the *sukshmaprasadaja* part of *dhatu*,which also nourishes the subsequent dhatu. *Upadhatu* of *mamsa* is *vasa*.It is a lubricating agency placed for smooth functioning of muscles. Allthese descriptions consistent with the recent advancement in physiology and biomolecular studies of adipocytes present in different parts of the body.

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