CLINICAL EVALUATION OF MEDADUSTI IN PRAMEHA W.S.R. TO ITS THERAPEUTIC MEASURES WITH MUSTAK

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ABSTRACT

Introduction: *Agni (digestive and metabolic energy)* is the main factor for digestion and metabolism. *Meda (a type of body tissue i.e., fats)* is formed from the *Mamsa (a type of body tissue i.e., muscle)* with its own *Ushma (heat)* in addition to the *Snigdhatva (unctuousness) & Dravadtva Guna (liquidity)* of *Apa Mahabhuta (one of the fundamental components of this universe i.e., water)*. Due to impairment of *Dhatvagni (metabolic energy)*, *Medadusti (impairment of fats)* takes place and in turn may result in *Prameha (diabetes mellitus)*, *Sthaulya* (obesity) etc. *Prameha* is one of the leading diseases in the present era. The aggravated *Kapha* afflicts *Meda*, *Mamsa* and *Kleda (moisture elements of the body)* and in due course of time, *Kaphaja Meha (a type of Prameha)* is converted into *Pittaja Meha (a type of Prameha),* followed by *Vataja Meha (another type of Prameha)* if not treated properly. **Aim:** The present study was carried out to evaluate the concept of *Meda* and the role of *Medadusti* in the pathogenesis of *Prameha* along with the efficacy of the selected drug *Mustak* (Cyperus rotundus Linn.) to combat the situation. **Material & Methods:** In selected 35 patients of *Prameha* having the *Medadusti Lakshan* based on inclusion and exclusion

criteria, *Mustak (Cyprus rotundus* Linn*.)* was administered in stipulated dose (12 grams in two divided doses with plain warm water) for two months. **Result:** The subjective parameters for *Medadusti* is clinically present in a maximum number of *Prameha* patients. The result also reveals the significant efficacy of *Mustak* on relevant subjective and objective parameters with a 'p-value <0.001 in all subjective and objective parameters. **Conclusion:** The *Nidan (aetiology)* of *Medadusti* has a definite role to cause *Prameha*. In all the patients of *Prameha, Medadusti Lakshan* (features of impaired fatty tissue) is clinically present. The patients suffering from *Prameha* can be treated with the drug response to arrest the *Medadusti* like *Mustak.*

Keywords: *Medadusti, Mustak, Prameha*

INTRODUCTION

Agni is the main factor for digestion, absorption and metabolism [1]. The root of *Annavaha Srota* (food channels) is *Amashaya* (stomach) and *Vamaparsha* (omentum)[2]. The food provides nourishment to the tissue elements of the body, which are homologues and not contrary [3]. The ingested food material at first goes through digestion and is followed by absorption and metabolism with the action of *Jatharagni*, *Bhutagni* and *Dhatvagni* respectively. The pure and waste product of food after digestion and metabolism enter into circulation[4] through the same channel. This *Dhatu (body tissue)* has its channel for circulation. Food articles are composed of five *Mahabhutas*. *Agni* is specific out of these five *Mahabhutas* that helps in the digestion and absorption of the respective food ingredients [5]. By virtue of seven categories of *Agni*, these tissue elements get metabolized in the way of transformation of nourishing materials and transformation of waste products [6].

Lipids are a heterogeneous group of fat-like substances which are water-insoluble but generally fairly soluble in an organic solvent like ether, benzene or chloroform. Simple lipid consists of three molecules of fatty acids, attached by an ester linkage to a molecule of glycerol. This large molecule is a triglyceride or natural fat. Most of the fat in a normal diet is neutral fat and any excess is stored in adipose tissue in this form. In the adult mammal, more than 10% of body weight may be stored triglycerides. Compound lipids contain other elements such as sulphur, phosphorus, nitrogen in addition to the carbon, hydrogen and oxygen simple lipids. Phospholipids are compound lipids, containing two fatty acids attached to the glycerol molecule. Instead of the third fatty acid, they have a phosphate molecule usually with an additional water-soluble molecule attached to it. This chemical constitution makes the phospholipid molecule amphipathic, with a non-polar, water-insoluble part and a high polar, water-soluble part, rest of the molecule.

Phospholipids and cholesterol are found throughout the body as part of the cell membrane and many structures that are formed from membranes, such as the endoplasmic reticulum, mitochondria, myelin sheath of nerves and the nuclear membrane. Many important compounds such as steroid hormones and bile salts are derived from cholesterol. All these types of fats are found in the blood in combination with protein as lipoproteins which act as a means of transport of the lipids. In the subsequent process, *Rakta (blood)* with the help of *Ambu (water), Teja (energy)* and *Ushma* (heat) is compacted and gets transformed into *Mamsa (muscle tissue)* [7]. The *Sneha* of the formed *Mamsa* is termed as *Vasa* [8]. *Sneha* and *Drava* are the qualities for which lipids are formed from fatty acids. *Meda* is formed from the *Mamsa* with its own *Ushma* in addition to the *Snigdhatva* and *Dravatva Guna* of *Apa Mahabhuta* [9].

Oja (the essence of all body tissues) constitutes the essence of all the seven *Dhatus* taken together [10]. Practically, *Oja* is the essential product of all the *Dhatus*, produced during specific *Dhatwagni Paka (metabolic process)* [11] and causes the protective mechanism of the body due to its *Sneha Guna* [12], simultaneously related to lipoprotein as *Meda-Oja (the essence of fatty tissue).*

Intake of excessive *Kapha* aggravating diet and less physical exercise directly converts the *Apakva Ahar Rasa (undigested food)* into saturated fat in the body for which immunity is impaired and the nutritive channels are occluded [13]. The excessive intake of food – the meat and sleeping during the daytime directly vitiates blood [14]. The saturated fatty acid has the only single bond between the C-atoms of the chain. Palmitic acid is the most abundant saturated fatty acid found in animal food. Saturated fatty acid usually forms solid fats, such as margarine or lard.

Unsaturated fatty acids contain one or more double bonds between the carbon chain atoms. This gives rise to geometric isomerism, known as cis-trans isomerism because of the four valance bonds of the double-bonded C-atoms in one plane and there is no freedom of rotation about the axis of the double bond. As a result of this, there is a greater rigidity of the structure of this unsaturated fatty acid, an important determinant in cell membranes structures and function.

Altered metabolism of triglyceride-rich lipoproteins is crucial in the pathophysiology of the atherogenic dyslipidemia of diabetes. Alterations include both increased hepatic secretion of VLDL and impaired clearance of VLDL and intestinally derived chylomicrons. An important consequence of retarded clearance is prolonged plasma retention of both VLDL and postprandial chylomicrons as partially lipolyzed remnant particles. These remnants, which include cholesterol-enriched intermediate-density lipoproteins (IDLs), are particularly atherogenic in humans and several animal models [15].

Lack of exercise, the habit of sleeping during the daytime, excessive intake of fatty substances and excessive intake of fermented drinks like *Varuni Madya (a type of alcoholic substance)* vitiate *Medavaha Srota* [16]. Increased hepatic production and/or retarded clearance from plasma of large VLDL also results in increased production of precursors of small dense LDL particles. Plasma VLDL levels correlate with increased density and decreased size of LDL. In addition, LDL size and density are inversely related to plasma levels of HDL, especially the HDL subclass. The reductions in HDL associated with type 2 diabetes and insulin resistance are multifactorial, but a major factor appears to be increased transfer of cholesterol from HDL to triglyceride-rich lipoproteins, with the reciprocal transfer of triglycerides to HDL. Triglyceride rich HDL particles are hydrolyzed by hepatic lipase and, as a result, are rapidly catabolized and cleared from plasma, resulting in a low level of HDL in plasma [17].

Several diseases are produced due to *Medadusti*, among which *Prameha* is the most important one. The number of people suffering from *Prameha* i.e., diabetes has risen from 108 million in 1980 to 422 million in 2014. In 2014, 8.5% of adults aged 18 years and older had diabetes [18]. In the human body, *Prameha* occurs in two different pathways – one due to *Dhatu Kshaya* (depletion of body tissues) and another is due to *Avaran (impairment* of physiological process*)*. The aggravated *Kapha* afflicts the *Meda, Mamsa* & *Kleda* and produces *Kaphaja Meha* and likewise when aggravated *Pitta* afflicts the same ultimately produces *Pittaja Meha*. When diminution of both Kapha and *Pitta* occurs this led to the aggravation of *Vata* which ultimately gives rise to *Vataja Meha* following the *Dhatukshaya* pathogenesis if not treated properly [19]. On the other hand, when the path of *Vata* is obstructed due to several factors then the *Vata* together with the *Ojas* comes down to reach the *Vasti* causing *Prameha* to follow the *Avaran* pathogenesis [20]. In both types of *Prameha*, the *Meda Dahtu* should be considered as chief *Dushya* (afflicted body tissue) [21].

The present study was carried out to evaluate the concept of *Meda* and the role of *Medadusti* in the pathogenesis of *Prameha* with modern views, along with to evaluate the efficacy of the selected drug i.e., *Mustak* (Cyperus *rotundus* Linn.) clinically on *Medadusti* and subsequently its role to combat *Prameha*.

Materials and Methods:

Medadusti is the main pathological cause in *Prameha*. The literary information regarding *Medadusti* in *Prameha* was verified through a clinical study. Assessment of *Medadusti* in *Prameha* was done on the basis of some subjective criteria and biochemical laboratory tests.

The study has been also carried out to evaluate the clinical efficacy of *Mustak* (*Cyperusrotundus* Linn.) in *Medadusti* as occurs in *Prameha*.

Mustak is a known drug that is effective in *Medadusti*. This drug was administered to the patients included in the study to observe the improvement of subjective and objective criteria. The subjective and objective criteria were evaluated before and after treatment.

Selection of Patients:

35 patients were selected from OPD and IPD of Institute of Post Graduate Ayurvedic Education & Research at SVSP hospital, Kolkata irrespective of their sex, occupation and religion. The patients having the *Lakshan* (features) of *Prameha* were selected for the study and subsequently, the features of *Medadusti* were evaluated on the basis of subjective and objective parameters. Before carrying out the study the respective ethical clearance was taken [22].

Inclusion Criteria:

Patients presenting *Prabhuta Mutrata* and *Avila Mutrata*, correlated with polyuria and increased turbidity of urine (which was measured by- urine output > 50ml/kg bd. wt. / 24 hours in comparison to water intake and analysis of urine) along with patients having Fasting Blood Sugar (FBS) >110mg/dl but< 140 mg/dl and Post Prandial Blood Sugar >200 mg/dl but < 250 mg/dl.

Subjective Parameters:

In *Medadusti*, though several numbers of signs and symptoms are manifested (as tabulated in table no. 2) considering the presented sign and symptoms of the attended patients of *Prameha*, the specific features in respect to *Medavriddhi* (type of *Medadusti*) like - *Snigdha Angata* (unctuousness of body)*, Kshudra Swasa* (mild respiratory distress) & *Durgandhata of Sharir* (foul smell of body)[23] were considered as subjective parameters for the presented study.

Objective Parameters:

Laboratory investigations for lipid profile i.e., estimation of serum cholesterol level, serum HDL cholesterol level, serum triglyceride level & estimation of blood sugar (Fasting and PP) level were taken as objective parameters [24].

Adoption of the Drug:

Mustaka (*Cyperus rotundus Linn*.) is a plant, which is clinically effective on *Medadusti* and subsequently combats *Prameha* by the virtue of *Tikta, Katu* and *Kashaya rasa*, *Laghu Ruksha Guna* and *Katu Vipaka* [25]. Powder of tuber of *Mustak* (*Cyperus rotundus* Linn.) with plain warm water was administered in the selected patients at a dose of twelve (12) grams in two divided doses per day (i.e., 6 grams of powder in a single dose) for a period of two months. After two months, the effect of the stipulated drug was evaluated.

Study Protocol:

Duration of study:

The duration of the study was one and a half years.

Assessment Criteria:

The assessment was done on the basis of subjective and objective criteria before and after treatment.

Follow up of Patients:

All the patients were reviewed after two months from the date of administration of the first dose. Any special information regarding the general health of the patient was recorded accordingly.

Study Sample:

A total of 35 patients of *Prameha* with *Medadusti* were included in the study.

Statistical Analysis:

The information gathered on the basis of observation made about various parameters was subjected to statistical analysis in terms of Mean, Standard Deviation (SD) and Standard Error (SE). Paired 't-test was carried out at $P<0.05$ and $P<0.001$. The obtained results were interpreted as -

$P<0.05$ is significant & $P<0.001$ is highly significant.

Observations and Results:

Among the 35 patients, a total of 3 patients were dropped out during the study course. Hence complete clinical survey was done on 32 patients. The distribution of subjective parameters of *Medadusti* among the 32 patients of *Prameha* shows that *Snigdhaangata* was present in 30 patients (93.75%), *Kshudraswas* present in 26 patients (81.25%) and *Sharir Durgandhata* present in 31 patients (96.87%) [table no. 3]. Statistical analysis of subjective and objective parameters of *Medadusti* in 32 patients of *Prameha* before and after

treatment shows that *Mustak* has significant efficacy on both the subjective and objective parameters with 'p-value <0.001. [table no. 4].

DISCUSSION

In the present era, patients suffering from *Prameha* come before the physician at the very manifestation of *Purvarupa* (prodromal features) of *Prameha* as mentioned in the compendium due to their health consciousness. And subsequently, *Medadusti Lakshan* is identical to that of the *Purva Rupa* of *Prameha*. The term *Linga* or *Lakshan* is also implied for *Purvarupa* [26]. Considering this in table no. 2 the identical *Lakshan* of *Medadsuti* and *Prameha* have been tabulated [27].

Avyayam (absence of physical exercise) and *Divaswapna* (habit of the day sleeping) cause Medadusti and *Prameha* directly. But *Medyanam Atibahkshanam* (excessive intake of fatty substance) and *Varuni Madya Atisevanam* (excessive intake of alcoholic substance) cause *Medadusti* directly but indirectly they are related with the *Habyishanna Bhojana* (where the fat substances are maximum) and *Ikshu Vikriti* (sugarcane products) accordingly, thus act as a causative factor of *Prameha*. In the above context, the identical *Nidan* of *Medavaha Srotadusti & Prameha* has been tabulated in table no.1 [28].

Table 3 shows that most of the patients of *Prameha* were satisfying the subjective criteria of Medadusti. It signifies that *Medadusti* is an essential phenomenon in the cases of *Prameha*.

Table 4 shows the statistical analysis before and after administration of the drug Mustaka (*Cyperus Rotundus* Linn.) This table shows the 'p-value <0.001 in most of the parameters (subjective and objective), which indicates that the drug taken for the present study is highly efficacious in *Medadusti* and subsequently in *Prameha*.

The probable mode of action of *Mustak* is given below [29]:

Due to *Laghu* and *Ruksha Guna*, which are *Vata & Agni Mahabhuta Pradhana*, *Mustak* causes *Kapha* and *Meda Nashan*. Due to *Katu Rasa* (Vata & Agni Mahabhuta Pradhan) it causes *Kapha Meda Nashan*, due to *Tikta Rasa* (Vata + Aksha Mahabhuta Pradhan) it causes *Kledasoshan & Medanashan* & due to Kashaya *Rasa (Vata & Prithivi Mahabhuta Pradhan)*, *Mustaka* causes *Lekhan* and *Kleda Soshan*. Also due to *Sheeta Virya* and *Katu Vipak*, *Mustak* causes *Vata Prakopa*, which in turn causes *Lekhan* and *Kleda Soshan*. Thus, *Mustak* acts against the *Meda Dusti*.

CONCLUSION

The *Nidan* of *Meda Dusti* has a definite role to cause *Prameha*. In all the patients of *Prameha*, *Meda Dusti Lakshan* is clinically present. The patients suffering from *Prameha* can be treated with the drug response to arrest the *Medadusti* like *Mustak*.

Table 1: Showing the distribution of subjective parameters of *Medadusti* among the 32 patients of Prameha:

Sl. No.	Subjective Parameters	Number of Patients	Percentage
01.	*Singdhaangata*	30	93.75%
02.	*Kshudraswas*	26	81.25 %
03.	*Sharir Durgandhata*	31	96.87 %

Table 2: Showing the statistical analysis of subjective and objective parameters of *Medadusti* in 32 patients of *Prameha* before and after treatment:

Parameters	Mean BT	Mean AT	SD +/-	SE +/-	't' value	'p-value
Snigdhaangata	1.65	0.56	0.53	0.0938	11.62	<0.001
Kshudraswas	1.40	0.37	0.473	0.083	12.40	<0.001
Sharira Durgandhata	1.34	0.37	0.594	0.105	9.21	<0.001

FBS	137.18	135.43	1.106	0.198	8.83	<0.001
PPBS	192.5	183.78	1.26	0.226	9.81	<0.001
Serum Cholesterol	211.25	209.96	0.456	0.082	15.6	<0.001
Serum HDL cholesterol	72.12	71.81	0.534	0.096	13.64	<0.001
Serum Triglyceride	168.87	166.81	1.91	0.343	6.00	<0.001

Table 3: Identical *Lakshan* of *Medadusti* & *Prameha*:

Sl. No.	*Lakshan* (clinical features)	*Meda Dusti*	*Prameha*
01.	*Alasyam* (laziness)	+	+
02.	*Hrid-Netra-jihva-shravana Upadeha (*adherence of excreta in heart, eyes, tongue and ear)	+	+
03.	*Jatilabhava Keshesu* (matting of hair)	+	+
04.	*Karapadoyo Daha (burning sensation in hand and feet)*	+	+
05.	*Karapadayo Suptata (numbness in hand and feet)* *Kaya Malam (increase amount of excreta from the body)*	+	+
06.	*Kayachhidreshupadeham (adherence of excreta in the orifices of the body)*	+	+
07.	*Kesha Nakhativriddhi (excessive growth of hair and nails)*	+	+
08.	*Mukha Talu Kantha Sosha (dryness of mouth, palate and throat)*	+	+
09.	*Madhuryamasya (the sweetness of mouth)*	+	+
10.	*Mutreabhidhavanti Pipilikashcha (attraction of ants by urine)*	+	+
11.	*Madhurshukla Mutrata (sweet and whitish urine)*	+	+
12.	*Nidra (excessive sleep)* *Pipasa (excessive thirst)*	+	+
13.	*Paridaham Angeshu (burning sensation in body)*	+	+

14.	*Sajyaasanaswapna sukham (sedentary habit)*	+	+
15.		+	+
16.		+	+

Table 4: Identical *Nidan* of *Medavaha Srotadusti* & *Prameha*:

Sl. No.	*Nidan*	*Meda Dusti*	*Prameha*
01.	*Avyayam*	+	+ (direct)
02.	*Divaswapna*	+	+ (direct)
03.	*Medyanam atibhakshanam*	+	+ (indirect)
04.	*Varuni madya atisevan*	+	+ (indirect)

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