

## Conceptual Analysis of *Rasagni* in *Madhumeha* (Diabetes Mellitus)

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### Abstract:

Sedentary life style and stressful mental conditions in the present scenario have invited many dis-tressing diseases. Diabetes mellitus (DM) is one of it and described in *Ayurveda* as *Madhumeha*, which literally means excessive urine with sweet taste like honey. India with its dubious distinction of being called the diabetes capital of the world is presently estimated to have over 30 million indi-viduals affected by this deadly disease. A striking example of the rise in prevalence of diabetes in India is the fivefold increase from 2.1% to 12.1% seen from 1970 to 2000.

Diabetes mellitus is a group of metabolic diseases characterized by high blood sugar (glucose) levels that result from defects in insulin secretion, or action, or both. *Agni* is the term given in *Ayurveda* for digestion and metabolism, envisaged in *Jatharagni*, *Dhatwagni* and *Bhutagni*. Among 13 types of *Agni* *Jatharagni* is the prime one and nourishes the other *Agnis*. *Jatharagni* refers to the whole process of digestion in G.I.T. *Bhutagni* refers to the final digestion in liver. *Dhatwagni* refers to tissue metabolism.

According to modern science, hormones and enzymes also act as catalyst in metabolic transforma-tion similar to that of *Dhatwagnis* in *Ayurveda*. In the body, BSL (Blood Sugar Level) is maintained with help of Insulin, thyroxine, glucagon (Pancreatic and thyroid hormones) which can be said as *Rasagni* because the function of *Rasa Dhatu* is *Preenana* (Nutrition), Similar to blood Sugar which acts as main source of energy for nutrition. This concept is helpful in understanding *Samprapti* of metabolic diseases like *Madhumeha*. Drugs acting at the level of *Rasagni* are useful in treatment of Diabetes mellitus. This review is an attempt to compare Insulin, thyroxine, glucagon with *Rasagni* and drugs acting on it which is helpful in treatment of DM.

**Key Words:** *Agni*, Diabetes mellitus, *Madhumeha*, *Rasagni*, Drugs

### Introduction:

Diabetes mellitus is a complex metabolic disorder. Diabetes mellitus (DM) is the commonest endocrine disorder that may affect about five times more people by 2025, than it affects now.<sup>(1)</sup> India with its dubious distinction of being called the diabetes capital of the world is pres-ently estimated to have over 30 million individuals affected by this deadly disease. A striking example of the rise in prevalence of diabetes in India is the fivefold increase from 2.1% to 12.1% seen from 1970 to 2000.<sup>(2)</sup>

Diabetes is a chronic disorder of carbohydrate, fat and protein metabolism characterized by in-creased blood sugar levels. In *Ayurveda*, DM is referred to as *Madhumeha* or *Kshaudrameha*, which literally means excessive urine with sweet taste like honey. Amongst the twenty types of *Pramehas* described in *Ayurveda*, *Mad-humeha* caused by vitiation of *vatadosha* has many clinical similarities to the modern day Diabetes mellitus.

In *Ayurveda*, digestion and metabolism covered under term *Agni* which includes *Jatharagni*, *Dhatwagni* and *Bhutagni*. *Jatharagni* refers to the whole process of digestion in G.I.T.

*Bhutagni* refers to the final digestion in liver. *Dhatwagni* refers to tissue metabolism.

According to modern science, hormones and enzymes also act as catalyst in metabolic trans-formation similar to that of *Dhatwagnis* in *Ayurveda*. In body, BSL (Blood Sugar Level) is maintained with help of Insulin, thyroxine, glu-cagon (Pancreatic and thyroid hormones) which can be said as *Rasagni* because the function of *Rasa Dhatu* is *Preenana* (Nutrition), Similar to blood Sugar which acts as main source of en-ergy for nutrition. This concept is helpful in un-derstanding *Samprapti* of metabolic diseases like *Madhumeha* and hence in planning line of treatment according to *Ayurveda*.<sup>(3)</sup>

### Materials And Methods:

Only textual materials have been used for this study, from which various references have been collected. Main *Ayurvedic* texts used in this study are *Charak Samhita*, *Sushrut Samhita*, *Ashtang Sangraha*, *Ashtang Hridaya* and avail-able commentaries on these classics. Modern texts and related *Ayurvedic* texts, websites, arti-cles have also been searched.

## Review And Discussion:

Diabetes Mellitus<sup>(4)</sup>:

Diabetes is a group of metabolic diseases characterized by hyperglycemia resulting from defects in insulin secretion, insulin action, or both. The chronic hyperglycemia of diabetes is associated with long-term damage, dysfunction, and failure of different organs, especially the eyes, kidneys, nerves, heart, and blood vessels. Several pathogenic processes are involved in the development of diabetes.

These range from autoimmune destruction of the cells of the pancreas with consequent insulin deficiency to abnormalities that result in resistance to insulin action. The basis of the abnormalities in carbohydrate, fat, and protein metabolism in diabetes is deficient action of insulin on target tissues. Deficient insulin action results from inadequate insulin secretion and/or diminished tissue responses to insulin at one or more points in the complex pathways of hormone action. Impairment of insulin secretion and defects in insulin action frequently coexist in the same patient, and it is often unclear which abnormality, if either alone, is the primary cause of the hyperglycemia.

Symptoms of marked hyperglycemia include polyuria, polydipsia, weightloss, sometimes with polyphagia, and blurred vision. Impairment of growth and susceptibility to certain infections may also accompany chronic hyperglycemia. Acute, life-threatening consequences of uncontrolled diabetes are hyperglycemia with ketoacidosis or the nonketotic hyperosmolar syndrome. Long-term complications of diabetes include retinopathy with potential loss of vision; nephropathy leading to renal failure; peripheral neuropathy with risk of foot ulcers, amputations, and Charcot joints; and autonomic neuropathy causing gastrointestinal, genitourinary, and cardiovascular symptoms and sexual dysfunction.

Madhumeha and Diabetes Mellitus<sup>(5)</sup>:

Madhumeha consists of two words - madhu and 'meha' where, 'madhu' denotes sweetness and 'meha' stands for urination. So, the disease in which the urination is having urine quality concordant with madhu (honey) in its colour, taste, smell and consistency called along with the pathognomonic features of Prameha (i.e., increased frequency and quantity of urine) is Madhumeha.

On the other hand, the word "Diabetes mellitus" consists of two words - Diabetes and mellitus, diabetes word derived from Greek which means "excessive discharge of urine" and word mellitus derived from Latin word mellitus, meaning 'mellite' (i.e., sweetened with honey; honey-sweet). The Latin word comes from mell, which comes from mel, meaning "honey", sweetness; pleasant thing. So, above descriptions shows that word Madhumeha and Diabetes mellitus have similar literal meanings.

## Concept of Agni:

*Ayurveda* has described an important factor of digestion and metabolism in our body as *Agni*. Therefore, *Ayurveda* considers that *Dehagni* is the cause of life, complexion, strength, health, nourishment, lustre, *Oja* (~immunity), *Teja* (energy), and *Prana* (life).<sup>(6)</sup> According to *Charakacharya*, after stoppage of the function of *Agni*, the individual dies, and when the *Agni* of an individual is *Sama* (normal state), then that person would be absolutely healthy and would lead along, happy, healthy life. But, if *Agni* of a person is vitiated, the whole metabolism in his body would be disturbed, resulting in ill health and disease. Hence *Agni* is said to be the *Mool* (base) of life.<sup>(7)</sup>

Power or state of *Agni* determines the quantity of food to be consumed.<sup>(8)</sup> Factors responsible for conversion (i.e., digestion and metabolism) of ingested food into appropriate *Dhatu* or tissues are grouped under term "*Agni*".

Types of *Agni*: According to *Arunadatta*, there are 13 types of *Agni* in the body.<sup>(9)</sup>

Table No. 1: Showing Types of Agni

Main type	Functions	No. and names of sub types
<i>Jatharagni</i> / <i>Udaragni</i>	Looks after the functions of food digestion and absorption	1- <i>Jatharagni</i> / <i>Udaragni</i>
<i>Bhautikagni</i>	Turns all the <i>Vijatiya Panchabhautic Dravyas</i> consumed to <i>Sajatiya Panchabhautic Dravyas</i> i.e., conversion of heterogeneous to homogeneous.	5 [ <i>Prithwi, Ap, Teja, Vayu, Akash</i> ]
<i>Dhatwagni</i>	Acts for the purpose of synthesis and breakdown of tissue.	7 [ <i>Rasa, Rakta, Mamsa, Medo, Asthi, Majja, Shukra</i> ]

**Concept of Dhatu:**

The term *Dhatu* is derived from the Sanskrit root *Du Dhatru* which means *Dharana* (to sup-port) and *Poshana* (to nourish).<sup>(10)</sup> *Dhatu*s con-tribute to make structural architecture of the body. They are seven in number. They are con-stantly formed, destroyed and reformed with appropriate materials derived from *Poshaka Dravyas* (nutrient substances) from the time of conception to that of death maintaining state of metabolic equilibrium. This process is known as *Dhatwagni Paka*. *Dhatu*s are of two kinds namely *Sthayi* or *Poshya* and *Asthayi* or *Poshaka*, corresponding to the seven, already existing, formed and stable *Dhatu*s and, an equal number of metabolically produced pre-cursor nutrient substances, which are meant to be utilised for nourishment, synthesis and main-tenance of *Poshya* or *Sthayi Dhatu*s, respec-tively.<sup>(11)</sup>

**Sthanastha Dhatu and Margaga Dhatu:** *Dhatu*s which are found in their respective *Aashayas* (place where they are present) are known as *Sthanastha Dhatu* and *Dhatu* which are flowing through *Dhamanis* (arteries) known as *Margaga Dhatu*.<sup>(12)</sup>

**Dhatwagni and Dhatwagni Paka:**

According to *Vagbhatacharya*, *Kayagni* (*Jatharagni*) *Ansha* (portion) located at specific *Dhatu* known as *Dhatwagni* of that *Dhatu*.<sup>(13)</sup> These *Dhatwagnis* are located in its own tissues according to its own *Srotas* (internal transport system of nutrition)<sup>(14)</sup>, either to form new tissue (anabolic) or to deliver its functions (catabolic). Hence if *Dhatwagni* gets more (*Vruddhi*), tissue delivers more action and thereby more catabolic activity (*Dhatu Kshaya*) or if *Dhatwagni* is of low profile, only tissue synthesis takes place resulting in *Dhatu Vruddhi* (increase in tissue).<sup>(15,16)</sup> According to *Charaka*, the nutrients that supports the body are sub-jected to *Paka* again, being acted upon by the seven *Dhatwagnis*, leading to the formation of two products i.e. *Kitta* and *Prasada*.<sup>(17)</sup> It means *Dhatwagni* acts as a catalyst for metabolic transformation.

*Dhatwagni Paka* corresponds to intermediate metabolism. *Dhatwagni* acts upon appropriate *Dhatu Poshaka Ansha* (nutrient substances) pre-sent in a potential form in *Aahara Rasa* (food after intestinal digestion) and produced *Asthayi Dhatu* or *Poshaka Dhatu* which built up *Sthayi* or *Poshya Dhatu* later in particular *Srotas*.

**Clinical Manifestation of Dhatwagni:**

The nutrient substances which nourish the *Dhatu*s undergo *Paka* by the *Agni* of that *Dhatu* known as *Dhatwagni* of that particular *Dhatu*. *Dhatwagnis* are seven in number<sup>(18)</sup>, correspond-ing to seven *Dhatu*s. *Dhatwagnis* mediate or catalyse further metabolic transformation of the nutrient substances, similarly hormones and en-zymes trigger the metabolic transformation in modern science.

Hormones are chemical messengers and en-zymes are biological catalysts. Both help in me-tabolism. So *Dhatwagnis* can be compared with hormones and enzymes as the functions of both are same. Ultimate goal is nourishment of “*Deha Dhatu*” (i.e. *Dosha*, *Dhatu* and *Mala*) which can be said as metabolic equilibrium.

**Importance of correction of Rasagni in Mad-humeha:**

Though *Madhumeha* is cause by all the 3 doshas, the *Kaphadosha* is of prime role in the *Samprapti* of *Prameha*. *Rasa Dhatu* has quali-ties very similar to *Kapha Dosha*. In the forma-tion of the *Dhatu*s, *Kapha* is the *Mala* (waste product) produced during formation of *Rasad-hatu*.

In *Madhumeha*, there is *Rasagni Mandya* which leads to increase *Apachita Rasa Dhatu*. *Rasagni Mandya* leads to improper processing of further *Dhatu* (*Dhatuposhana* & *Parinamankriya*) as they will not perceive adequate nutrition. The *Dhatu*s formed in *Madhumeha* are *Apachit* and *Dhatwagnimandya* creates excessive *kleda* in the body. If not treated earlier the *Dhatushaith-ilya* leads to *Ojakshaya*. increase in *kleda* leads to excessive *Mutra Uttapati* (*Prameha*), This is the *Samprapti* of *Madhumeha*.

To achieve the *Samprapti Vighatanatmak Chik-tsa* of *Madhumeha*, correction in *Rasagni* is needed. Ultimately, we get the well -formed *Sara Dhatu* and maintenance of *Ojas* within normalcy.

**Rasagni in Madhumeha (Diabetes Mellitus):**

The function of *Rasa Dhatu* is *Preenana* (Nutrition). *Rasa Dhatu* mainly forms by *Mad-hur Rasatmak* (sweet) *Dravyas* in the form of carbohydrates and fatty acids. These *Madhur Dravyas* are mainly used as source of energy. Similarly, blood Sugar acts as main source of energy which gives nutrition to the body. So, it can be said as *Asthayi Rasa Dhatu*. BSL is maintained with help of Insulin, thyroxine, glu-cagon (Pancreatic and thyroid hormones) which can be said as *Rasagni*.

Table No. 2: Showing Drugs Acting on Rasagni

<i>Depana</i>	<i>Pachana</i>
<i>Ajamoda,</i>	<i>Gaja Pippali,</i>
<i>Lasun,</i>	<i>Marich,</i>
<i>Amalaki,</i>	<i>Chvyra,</i>
<i>Pippali,</i>	<i>Pippali,</i>
<i>All Jeevaneeya Dravyas,</i>	<i>All Rasa Sodhakara Dravyas, etc</i>
<i>All Rasa Prasadakara Dravyas, etc</i>	

Table No. 3: Showing Formulations Acting on Rasagni

Formulations Acting on Rasagni <sup>(19)</sup>	
<i>Trikatu Choorna,</i> <i>Haridrakhanda,</i> <i>Laghusutasekhararasa,</i> <i>Ashwagandharishta,</i> <i>Amrutarista,</i> <i>Dashamoolarista,</i> <i>Draksharista,</i> <i>Kankasava,</i> <i>Elaadichoorna,</i> <i>Talisadichoorna,</i>	<i>Indukanta Ghrita,</i> <i>Kalyana Ghrita,</i> <i>Dhanwantari Vati,</i> <i>Gorochanadi Vati,</i> <i>Simhanaada Guggulu,</i> <i>Kasturibhairav Rasa,</i> <i>Vasantakusumakar Rasa,</i> <i>Sootasekara Rasa,</i> <i>Anandbhairavi Rasa, etc</i>

Diabetes is a group of metabolic diseases characterized by hyperglycemia resulting from defects in insulin secretion, insulin action, or both. From this it can be said that in diabetes mellitus (*Madhumeha*), there is deformity in *Rasagni*. So, drugs acting at *Rasagni* level are useful in treatment of *Madhumeha* (DM). This concept formed the basis of study which helps in deciding line of treatment.

#### Conclusion:

After detail discussion on concept of *Dhat-wagni* and its clinical manifestation, it is concluded that *Rasagni* can be compared with hormones and enzymes which are Insulin, thyroxine, glucagon (Pancreatic and thyroid hormones), as the function of both are same i.e., metabolic transformation. In diabetes mellitus (*Madhumeha*), there is deformity in *Rasagni*. Various drugs acting on *Rasagni* are useful in treatment of *Madhumeha* (DM). This concept enables a proper appreciation of the possible scientific implementation of these *Ayurvedic* concepts.

Principles of *Ayurveda* which are interwoven with basic concept of life have significant value even in the life of modern men. But nowadays, those principles are not followed leading to many metabolic diseases such as *Madhumeha*. This concept of *Rasagni* is helpful deciding proper line of treatment.

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**Conflict of Interest:** Nil

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