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Shilajatu and Swarna Makshika– A promising ayurvedic combination in the management of Madumeha (Diabetes)

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ABSTRACT

Madumeha is a general systemic disease caused by the derangement of tridoshas and manifest through the symptoms of urinary system. Diabetes can be included under the broad concept of *Madumeha*. The estimate of the actual number of diabetics in India is around 40 million, which causes a major health concern. *Acharya Susruta* has mentioned two *rasayana* in *Madumeha cikitsa*. They are *Shilajatu* and *Makshika rasayana*. Both these are having *Tridoshashamana*, *Agnideepana*, *Medohara*, *Balya*, *Cakshushya*, *Vrishya* and *Yogavahiproperty*. These minerals are richest source of many micronutrients Diabetes mellitus and vice versa can disrupt homeostasis of trace elements. The alteration of metals status increase oxidative stress that may contribute to the insulin resistance and development of diabetic complications. Thorough analysis of Ayurvedic concepts and modern research works carried out reveal that, *Swarna Makshika* and *Shilajatu* definitely play a role in glucose and insulin metabolism.

Keywords: *Swarna Makshika, Shilajatu, Madumeha, Diabetes.*

INTRODUCTION

Madumeha/Prameha is a general systemic disease, caused by the derangement of *tridoshas* and manifests through the symptoms of urinary system. Diabetes is included under the broad concept of *Prameha*. India leads the world with the largest number of diabetic subjects earning the dubious distinction of being termed the “diabetes capital of the world”^[1]. According to WHO estimates, by 2025; total 300 million of the world population will be affected by diabetes. According to the International Diabetes Federation (IDF) the total number of diabetic subjects to be around 40.9 million in India and this may rise to 69.9 million by the year 2025^[2].

Diabetes mellitus (DM) is a group of metabolic disorder of multiple etiologies characterized by insulin resistance, relative insulin deficiency and hyperglycemia with disturbances of carbohydrate, fat and protein metabolism^[3].

Kapha is the main morbid element vitiated in the genesis of *Prameha*. Incompletely transformed and aggravated *Tridoshas*, unite with *medodhatu*. This entity will vitiate other dashavidha *dushyas*^[4]. The special features of the morbid element in the disease is *Bahudravasleshma dosha vishesha* (enhanced liquidity of the *dosha*). The compactness or the consistency of these elements are slackened (*abadha*) in *Prameha*, and will be in an increased state, i.e. in *Prameha*, *dravaroopa mala vridhi* occurs and body will try to expel this morbidity through *mootramarga*. These are drawn into *vasthi*, seated where it produces *Prameha*^[5]. *Datwagnimandya* is one of the reason for the *badhaavastha of dooshyas*. The main action of insulin is increasing anabolic effects and decreasing catabolic effect. So in the absence of insulin, the anabolic effects on body became deranged.

There are two ways of presentation. *Prameha* can originate either first *kapha*, then progress *topaitika* and finally *vatika* stage or separately in the beginning itself *kapha* presentation or *pitha* presentation or *vatha* presentation. All the three types of morbidity have same *swabhava of medodhatu*. Frequent and profuse micturition with turbidity (*Praboothaavilamootratha*) is mentioned as the *samanyalakshana* (general symptom)^[6].

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Though Prameha is a *tridoshaja Vyadhi* according to *Brihat-trayee*, detailed classification of disease has been given by all of them. The body constitution and symptoms related to *Sahaja / krishapramehi* (hereditary Diabetes/Thin Diabetic patients) and *Apathyanimitaja/sthoola* (Stout Diabetic Patients). *Pramehi* (Occurred due to unwholesome diet and habits) have been described by *susruthacharya*.⁷ *Acharya Charaka* has mentioned, *Santarpanjanya* and *Apatarpanjanya Prameha*⁸ that can be correlated with *Avaranajanya* and *Dhatu-apakarshanajanya Prameha* respectively. Another classification is based on the colour and other characteristics of urine.⁹

The term *Madumeha* refers to all types of *Prameha* in general and also to a particular type of *Prameha*. All types of *Prameha* on chronicity becomes *Madumeha*. It can be affected with boils, acquire the technical term "*Madumeha*" because of the similarity of the aroma and taste of honey.¹⁰ In *Madumeha kupita vata extracts madurya and snigdhattha from ojas*.¹¹ Brings it to *rasa raktha circulating complex, leading to Madura abhishyandhi and kledagunavrdhi*. Vitiated *raktha* unable to nourish the *utharotharadhathu* will cause *abadhatwa* of *meda*. Vitiated *vata* carries *ojas* and *shithiladhathu* towards *vasti* and excreted as *Prabutaavila ojoyuktamootra*.

In DM, the imbalances of specific metals have a vital role in upsetting normal glucose and insulin metabolism, and the alteration of metals status can also increase oxidative stress that may contribute to the insulin resistance and development of diabetic complications.¹² In this paper an attempt is being made to critically analyze the logic behind the selection of two *Maharasa, Shilajatu* and *Swarna Makshika* in *Madumehacikitsa* by *Susruthacharya*, with classical and modern concepts.

MATERIALS AND METHODS

Susruthasamhitha, other Ayurveda classics and internet publications and journals were referred to compile the relevant information.

OBSERVATIONS

In view of its great importance, the treatment of *Madumeha* deserves separate discussion. Considering the *anushangitwa* and *darunathwa* of this *roga*, *Acharya Susrutha* has described *Pramehacikitsa* in three different chapters, gave separate chapters for *Prameha*, *Pramehapitaka* and *Madumehacikitsa*.

As the *bala* of a *Madumeharogi* is concerned, *shamana* therapies (pacifying therapy) are given more importance than *shodana* (elimination therapy). *Krishapramehi*, who are *durbala*, should be given *brmhanacikitsa* (nourishing therapy) and *sthoolapramehi*, who are strong and have more *doshas* in the body should be administered *shodanacikitsa*.¹³ After *shodana*, patient should be administered *santharpanacikitsa*, because in *Prameha* excessive *apatharpana* may lead to many serious upadrava. In addition, due to *agnipaghata*, there will be *kleda* and *medoadhikya* in *Prameha*. So treatment should be *kledamedoprashamana* through *Tejodathu vardhana*.¹⁴ All the *oushadaahara* administered should be *amootrala, balajanana* and *srothoshodaka*. Ultimately treatment should be a compacted form of *dhathutharpana*.

Susruthacharya has mentioned around five *Pramehaharaganas* in *dravyasangrahaneeya* chapter of *sutrasthana*. He has mentioned only 3 *rasayana* in *Madumehacikitsa*. They are *Shilajatu*, *Makshika* and *Tuvaraka*. *Salasaradiganabhavitha Shilajatu* and *Makshika* are advised in the beginning.

Shilajatu (*Asphaltumpunjabianum*) is a lac like substance which exudates from rocks. *Susruthacharya* has mentioned 6 types of *Shilajatu*. Among them *ayobhootha Shilajatu* (originated from stone rich in iron) is considered *sreshtha*. Another classification is *gomutra gandhi*

and *karpoora Shilajatu*.¹⁵ *Shilajatu* is *Tikthakatuka* with *kashayaanurasa, ushnaveerya, katupaka, sara, medohara, shoshana* and *chedana* with *yogavahi* property. It is *tridoshahara*, predominantly *kaphavatahara*. Dosage of *Shilajatu* is 2 *gunja* to 8 *gunja* as per *bala* and *kala*.¹⁶ In *Rasayana prakarana* of *Ashatangahrdya*, it is advised to give 1 *karsha* for 1 week, $\frac{1}{2}$ *pala* for 3 week and 1 *pala* for 7 weeks.¹⁷ The source and origin of drug is still a controversy.

Makshika dhathu is of two types, *Swarna Makshika* and *Rajata Makshika*. Among this *Swarna Makshika* (*chalcopyrite*) is considered superior to *Rajatha Makshika* (*iron pyrite*), which is a compound of Copper, Iron and Sulphur with the chemical formulae Cu_2S , Fe_2S_3 / $CuFeS_2$; while *Rajatha Makshika* is Fe_2S_3 , having wide range of therapeutic efficacy. *Swarna Makshika* has *Madhuratikta rasa, Snigdha guna, sheeta Virya* and *katu Vipaka*. It is *agnideepana, swarya, chakshushya, vrshya, grahi, rakthasravahara* and *rakthaposhaka* with *yogavahi* property. It is *tridoshahara*, predominantly *kaphapithahara*.¹⁸ *Swarna Makshika* can replace the role of *loha* and *swarna*. Also it is *laghu* compared to those drugs. It is frequently used in the form of *bhasma* with or without other herbomineral drugs.

Dosage of *Swarna Makshika bhasma* is $\frac{1}{2}$ *gunja* to 2 *gunja* as per *bala* and *kala*.¹⁹ We should be cautious, while using the market available samples of *swarna Makshika*, as adulteration of this drug is very common.

Administration of rasayana in Prameha

Bhavana of the drugs should be done in *salasaaradigana*, for 10, 20 or 30 days. It should be administered in the early morning along with *sarodaka*, after *dehashudhi*.²⁰ *Salasaraadigana* is indicated in *kushta, meha* and *panduroga*. It is *kaphamedo vishoshana*.²¹ After digestion of medicine, he/she is advised to take *jangala rasa* (Soup of animals residing in dry land) to avoid *vatakopa* which further leads to *shoshana* and *chedana*. A person who take 1 *tulam* (100 *pala*) *Shilajatu* in his life time will acquire good health, *varna, bala* and will become *Madumeha varjitha*.²² *Shilajatu* subjected to *bhavana* in *Pramehagna oushadhaniryootha* and intake of it will cure *sarvameha* and all *pitaka*.²³ *Ashtangahrdya* mentioned it as *agryaoushada* in *vastigata roga*.²⁴ In *Yogaratanakara*, *Shudha Shilajatu* is advised to take with milk and *sitha* in the early morning for 37 days.²⁵

After explaining *Shilajatu rasayanavidhi*, *Acharya susrutha* advised the use of *Makshikadhatuprayoga* in the similar way. It is mentioned to avoid *kulatha* and *kapotha* during intake of these 2 *rasayana*. All *pariharavidhi* should be followed, twice that of the *oushada sevana*.²⁶

Finally he explained *tuvaraka rasayana*. *Tuvaraka rasayana*, is *agrya* in *Prameha* and *kushta*.²⁷ Moreover *Madumeharogi* is a *durvirechya*,²⁸ it may be the reason for advising particularly this yoga in this context.

DISCUSSION

Shilajatu is Well known for its *naimittika rasayana* effect, *ojovardhaka* and *Pramehagna* property. *Swarna Makshika* is *agrya* among all *rasayanas* which is famous for *dehavada* and *lohavada* property.²⁹ Being a *rasayana*, they act primarily at the level of *rasadhathu* (improves nutritional status), Improves the quality of *dhatu* production by improving *agni* and removing *srothorodha*. Ultimately it may decrease *dhathushaithilya* and strengthen the *ojas*.

After critically analysing some formulations, it was observed that 25% of formulations containing *Swarna Makshikabhasma* are indicated in *Prameha*. Some *Prameha hara* drugs like *Chandraprabhavatika, Mehavajra rasa, Meghanata rasa, Sarveshvara rasa* etc possess both *Makshika* and *Shilajatu*. *Swarna Makshika* is an ingredient of many *Prameha hara yogas* like

Apoorvamalini *vantharasa*, *Bhathvangeshwara rasa*, *Yogaraja rasa* etc. Use of *Makshikabhasma* with *madhu orgudoochi* in *pithajameha* is mentioned in *Yogaratanakar*³⁰. In *Sara leha* which is indicated to cure all types of *Prameha*, *ayas* and *tamrachoorna* are 2 ingredients.³¹

According to *vyadhiavastha*, we have to eliminate the improperly manifested *soumyabhava mala* and then go for *santharpana* treatment. The best way for eliminating this *saumyabhavaadhika mala* is *shoshana* or *rookshana karma*. Both these *rasayanas* are of *tridoshashamana*, *agnideepana*, *medohara*, *balya*, *cakshushya*, *srothoshodana* and *vrishya* with *yogavahi* property. *Rookshaguna* of *thiktha rasa* helps in eliminating the increased and loosely compacted body elements through it *soshana karma* and there by removes the *mandatha* of *dhatwagni* and by its *laghuguna* it activates the *dhatwagni*. As the drugs cause *shoshana* in the body, usage of *mamsa rasa* is advised. Above said drugs with different *virya* and *dosha hara* property can be wisely selected based on the *vyadyavastha* of the patient. *Kushta hara* property helps to cure the *Madumehapitaka*. Above all the synergetic action (*yogavahitwa*) of these drugs, will help to increase the potency of adjuvant many times. These all factors makes it therapeutically superior.

Body consists of more than 70 elements and the deficiency of these essential elements causes various disorders³². Diabetes mellitus can disrupt homeostasis of trace elements. On the other hand, disturbance in trace element status in diabetes mellitus may contribute to the insulin resistance and development of diabetic complications.³³ Tight glycemic control is the most effective way of preventing or decreasing these complications.³⁴ This can be easily achieved with the help of some minerals and vitamins which are also able to exert antioxidant activity, thereby reducing diabetic complications.³⁵

Mineral drugs always remain superior to herbal and animal products in Ayurvedic therapeutics. Due to certain better qualities like prompt action, palatability, effectiveness with minimal doses, and long shelf life, mineral preparations are preferred over herbal formulations.³⁶ *Swarna Makshika* and *Shilajatu* are such minerals rich in micronutrients which after proper processing, become highly potent and utilised for diseases like *Prameha* etc.

Shilajatu consists of humic substances like DBP, Fulvic acid, Humic acid etc. It is also rich in micronutrients like Fe, Zn, Mn, Mg, V, K, Ni and many organic matters like benzoic acid, amino acids etc. *Shilajatu* has been reported to reduce macrophage and lymphocyte activation and migration, as a part of its immunomodulatory activity. Moreover, being an antioxidant it will prevent damage to the pancreatic islet cell induced by the cytotoxic oxygen radicals.^[37,38,39] Gupta *et al* suggested that long-term treatment with *shilajit* increases the number of β -cells of pancreas, i.e. pancreatotrophic action, which may result in better sensitivity of pancreatic β -cells with prompt secretion of a large quantity of insulin in response to hyperglycemia. The hypoglycemic effect of *Shilajatu* (100 mg/kg) is significantly higher than that of metformin (500 mg/kg).⁴⁰

The main three elements in *Swarna Makshika* i.e. Copper, iron and sulphur are essential and play a role in the formation of Haemoglobin. XRD of different samples of *Swarna Makshika Bhasma* revealed that raw *Swarna Makshika* contains CuFeS_2 , which was converted into sulfides of copper and iron and, oxide and sulfate of iron after *Shodhana*. Major compounds identified in *Bhasma* of different samples were Fe_3O_4 , Fe_2O_3 , FeS_2 , FeSO_4 , and Cu_2S .⁴¹ Trace elements like Mg, K, Si, and Al were also found.⁴²

The relationship between type 1 diabetes and type 2 diabetes and metal (Cr, Cu, Fe, Hg, Mn, Ni, Pb, Se, and Zn) blood concentration was evaluated in an Italian population. Results indicated that both type 1 and type 2 diabetes are associated with low levels of Cr, Mn, Ni, Pb and Zn. Cr appears to act by enhancing insulin's actions, with increases the

number of insulin receptors. Mn helps to increase the Mn-SOD activity and normalize insulin synthesis and secretion. Similarly, a supplementation with Zn would be helpful for the glycemic control, insulinomimetic effect and prevention of oxidative damages. Cu supplementation in mice can prevent STZ-induced type 1 diabetes through the suppression of oxidative stress. The non-toxic levels of Ni and Pb found in diabetics can be interpreted in protective effects against the diabetes onset, in particular against diabetes complications and glucose deregulation. In animal models vanadium has been shown to facilitate glucose uptake and metabolism, lipid and amino acid metabolism, improve thyroid function and enhance insulin sensitivity.⁴³ Age-Related macular degeneration Study-based micronutrients inhibit the development of diabetic retinopathy in rodents by inhibiting oxidative and nitrate stress.⁴⁴ The use of minerals like vanadium, chromium, magnesium, zinc, selenium, copper and vitamins or cofactors (tocopherol [vitamin E], ascorbic acid [vitamin C], ubiquinone [ubiquinone; coenzyme Q], nicotinamide, riboflavin, thioctic acid [lipoic acid], flavonoids) are advised in diabetes, with a particular focus on the prevention of diabetic complications⁴⁵. In spite of all the merits excessive accumulation of metals may adversely affects the situation.

CONCLUSION

Susruthacharya has mentioned 2 *maharasas*, *Shilajatu* and *Makshikadathu* in *Madumehacikitsa*. As the *bala* of a *Madumeharogi* is concerned, *shodana* is not an apt choice always, also excessive *santharpana* (*nourishing*) or *apatarpana* (Non nourishing and one causing depletion of *medodhatu* respectively) may make the condition worse. These drugs will provide the effect of *shodana* (purification), without hampering the *bala* (strength) of the patient. They are having properties, like *Tridosaharatwa*, *Medoharatwa*, *Agnideepana*, *Srothashodana*, *Yogavahitwa* (augments the action of medicine) etc. which helps to rectify the *utharotharadhatu dushti* occurring in *Madumeha* and provides *dathuprasannatha*. Moreover the *rasayana* property of these drugs helps to maintain the *roga* in its *yapya* stage, preventing further complications. In DM, the imbalances of specific metals will upset normal glucose and insulin metabolism, and the alteration of metals status can increase oxidative stress contributing to diabetic complications. These minerals are rich in many micronutrients, which makes it more favourable. The goal for treatment of diabetes is to prevent its acute manifestations and long-term microvascular and macrovascular complications.⁴⁶ These *rasayanas* can produce a better glycemic control along with improvement in the lipid profile. They are potent for the curative and preventive purpose and also provide strong and healthy body and delays ageing. So we may conclude that *Shilajatu* and *Makshikarasayana* are one of the best available treatment option in *Madumeha*, which offer a promising approach in the long-term management of diabetes mellitus, because of its multifaceted action.

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