

**ISSN**INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA

ISSN No. : 2584-2757

Volume : 02

Issue : 01

DOI : 10.5281/zenodo.13936881



Publisher

**ROGANIDAN VIKRUTIVIGYAN PG ASSOCIATION
FOR PATHOLOGY AND RADIOGNOSIS**

Reg. No. : MAHA-703/16(NAG)

Year of Establishment – 2016

INTERNATIONAL JOURNAL OF DIAGNOSTICS AND RESEARCH

A Study Of Concept Of Dhatugat Avashta In Madhumeha And Its Resemblance To Complication Of Type 2 Diabetes Mellitus

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Article Info: Published on : 15/10/2024

Cite this article as: - Dr. Abhijeet Bageshwar (2024) ; A Study Of Concept Of Dhatugat Avashta In Madhumeha And Its Resemblance To Complication Of Type 2 Diabetes Mellitus; Inter.J.Dignostics and Research 2 (1) 55-64, DOI: 10.5281/zenodo.13936881

Abstract

Madhumeha is one of the subtypes of *Vataj Prameha*, characterised by [honey] *Madhu* like properties of urine of patient. Clinical features of *Madhumeha* like polyuria, sweetened and turbid urine can be correlated to that of type 2 Diabetes mellitus, which has proved be major prevalent health issue worldwide. Uncontrolled and unhealthy regimen further worsens the disease by landing patients into complications. 20% of total deaths caused by Diabetes mellitus are due to development of complications like cardiovascular diseases, nephropathies and neuropathies. Concept of *Dhatugat Avashta* described in *Ayurveda* and it resemblance with development of complications of Type 2 Diabetes mellitus. This is not only help to keep far these complications but also to bring forth improvised line of treatment for the disease and its complications. Thus, an attempt is made to explore *Dhatugat Avstha* of *Madhumeha* based on complications of type 2 Diabetes mellitus and enlighten the preventive and curative measures for the same.

Keywords : *Dhatugat Avastha*, *Madhumeha*, complications, Diabetes mellitus

Introduction:

Madhumeha is described in *Ayurveda* under the category of *Vataj Prameha*. & identified as Type 2 Diabetes Mellitus in modern medical terms. This condition is characterized by excessive urination of sweet, slightly turbid, and pale urine. It is linked with vitiation of *Vata* and *Kapha Doshas* and affects fat and other body tissues along with vital energy known as *Oja*, manifesting through the *Mutravaha Srotas* (urinary channels).^[1]

Madhumeha involves a complex interplay of *Doshas* (bodily energies), *Dushyas* (vitiating factors) and *Dhatus* (tissues) that can lead to various symptoms if not properly managed. When a patient with *Madhumeha* does not adhere to the prescribed treatment and dietary guidelines, the *Doshas* and *Dushyas* can become aggravated and start affecting different *Dhatus* in the body. When *Doshas* and *Dushyas* become imbalanced, they can lodge in particular *Dhatus* and manifest symptoms specific to that *Dhatu*, this is known as *Dhatugat Avastha* for the particular disease.

This *Dhatugat Avastha* in *Madhumeha* can be correlated to complications of Type 2 diabetes mellitus which further can increase your risk of developing complications such as cardiovascular disease, atherosclerosis, stroke, peripheral artery disease and chronic kidney disease.

Type 2 Diabetes Mellitus is characterized by chronic high blood sugar levels due to insulin resistance or insufficient insulin production and highlights a disturbance in metabolic processes leading to excess and altered urine production. As a consequence of hyperglycaemia of diabetes, every tissue and organ of the body under goes biochemical and structural alterations which account for the major complications

in diabetic which may be acute metabolic or chronic systemic symptoms.^[2] This can be studied the umbrella of *Dhatugat Avastha* and to develop improvised line of treatment for both *Madhumeha* as well as to prevent type 2 Diabetes mellitus.

Aim:

To study of concept of *Dhatugat Avastha* in *Madhumeha* and its resemblance to complication of type 2 diabetes mellitus

OBJECTIVE:

1. To study of concept of *Dhatugat Avastha* in *Madhumeha* and its resemblance to complication of type 2 diabetes mellitus
2. To study the *Dhatugat Avastha* in *Madhumeha* in detail
3. To study Complication of type 2 Diabetes Mellitus in detail

Review Of Literature: *Madhumeha*

Definition:

The disease in which the patient passes urine like honey and sweetness remains in the body is called *Madhumeha*. It is predominantly *Tridoshaj Vyadhi* but *Avrutta Vaat* and *Bahudrava Sleshma* are main elements.^[3]

Prameha is a group of disorders in which there is an increased frequency and volume of micturition, and the urine appears turbid. 20 types of *Prameha* have been mentioned. It is a silent killer and needs to be treated as early as possible to stop onset of complications. If *Prameha* is not treated properly, may convert into *Madhumeha*.^[4]

Samprapti (Pathogenesis):

Madhumeha can originate in two ways-^[5]

- 1) *Avaran Janya* (By the obstruction of *Vata* caused by *Doshas* covering it)

2) *Dhatukshaya Janya* (Depletion in body tissues causes aggravation of *Vata*)

In *Avaranjanya Madhumeha* the vitiated *Kapha Dosha* and *Meda Dhatu* (Fat tissue) obstruct the passage of *Vata Dosha*. In the process of manifestation of *Madhumeha*, the obstructed *Vata* is vitiated again and carries *Oja* to *Basti* (Urinary Bladder).

aggravated *Vata* in that body spreads along with *Oja* which is sweet in taste by nature. When due to the *Hetu Vata* convert into astringent taste and it take into urinary bladder due to its roughness, this causes *Madhumeha*.^[6]



Figure 1: Madhumeha Samprapti Avaran Janya & Dhatukshaya Janya

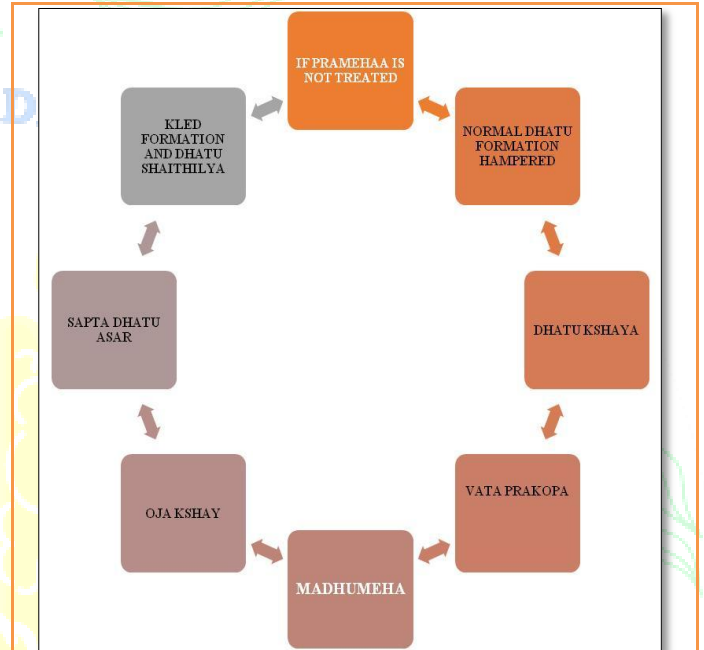


Figure 2: Madhumeha Samprapti:
(If Prameha is not treated properly, may convert into Madhumeha)

Though *Prameha* can be caused by any *Dosha*, some pathological changes are common in all types of *Prameha*. These are – *Dhatu Shaitihilya* (flaccidity of body constituents) and strain on *Basti* (urinary bladder). *Dosha* is accumulated at *Basti* or there is abnormal movement of *Dhatu* in *Basti* that alters the normal properties of urine. Though different etiological factors for each *Dosha* are mentioned for causing *Prameha*, the end result is same due to similar pathological procedure. If *Prameha* is not treated properly then it can land into *Madhumeha*.

When *vata* get immediately aggravated in an individual who's *Hetu Sevan* is ongoing and already *Pramehi* but not taken proper treatment and diet. The

Dhatugat Avastha:

Vata immediately aggravates in *Prameha* patient who is consuming the cause and is not on proper medication and diet. The aggravated *Vata* in that body spreads along with *Oja* which is sweet in taste by nature. When due to the *Hetu Vata* convert into astringent taste and it take into urinary bladder due to its roughness, this causes *Madhumeha*. Eventually each *Prameha*, whether it is *Kaphaj*, *Pittaj* or *Vataj*, if not treated appropriately will land into *Madhumeha* and thus *Dhatugat Avastha* in *Madhumeha* can be observed. Although, it is not precisely described in texts, in day-to-day practice, patients suffering from diabetic complications can be seen undergoing *Dhatugat Avastha*.^[7] In pathophysiology of *Madhumeha*, *Dhatvya-*

Agnimandya and *Dhatu Shaithilya* of every *Dhatu* is major event. But one particular *Dhatu* is seen affected to more extent and can thus be identified as *Dhatugat Avastha* in that patient.

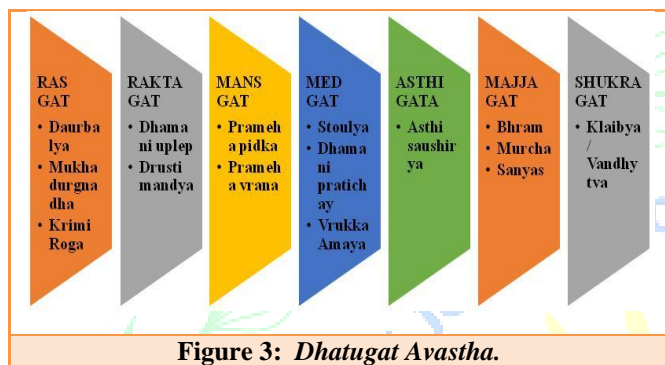


Figure 3: *Dhatugat Avastha*.

Chikitsa:

Madhumeha Chkitsa can be classified under 4 groups

1. *Krush Durbal*
2. *Krush Balvan*
3. *Sthul Durbal*
4. *Sthul Balvan*

Shodhan Karma, *Shaman Chikitsa*, *Santarpan*, *Aptarpan* and *Pathya* should be planned for *Madhumeha Chkitsa* accordingly.

In *Sthul Balvan* patient, *Shodhan Upkrama* according to their *Dosh*; and that in *Krush Durbal*, *Santarpan* and *Shaman Chikitsa* is considered.

Prameha is a chronic disease and hence *Shodhan* must be followed by *Santarpan Upkram*. If not done orderly, can lead to complications like *Gulma*, *Kshay*, *Bastiand Shool* [8]

Internal medications :

- *Arogya Vardini* – for *Dhatu Lekhan* (will repair *Dhatu Shaithilya*)
- *Vasantkusmakar*
- *Suvarnraj Vangeshwar*
- *Nisha Amalaki Ghan*

Diabetes Mellitus Type 2:

Diabetes mellitus is one of the most common endocrine disorders characterized by common feature of chronic hyperglycemia with disturbance of carbohydrate, fat and protein metabolism.

Diabetes classified into –

- 1) Type 1 (B cell destruction, usually leading to absolute insulin deficiency)
- 2) Type 2 (May range from relative insulin deficiency to predominantly secretory defect with insulin resistance)

Diabetes is a chronic disease that occurs either when the pancreas does not produce enough insulin or when the body cannot effectively use the insulin it produces. Insulin is a hormone that regulates blood glucose. Hyperglycemia, also called raised blood glucose is a common effect of uncontrolled diabetes and over time leads to serious damage to many of the body's systems, especially the nerves and blood vessels. Type 2 diabetes can increase your risk of developing complication, such as cardiovascular disease, atherosclerosis, stroke, peripheral artery disease and chronic kidney disease. In 2019, diabetes was the direct of 1.5 million death and 48% of all the deaths due to diabetes occurred before the age of 70 years. Another 4,60,000 kidney disease deaths were caused by diabetes and 20 % cardiovascular death. [9]

Pathogenesis :

Pathogenesis Diabetes Mellitus Type 2 is shown in below figure No.4

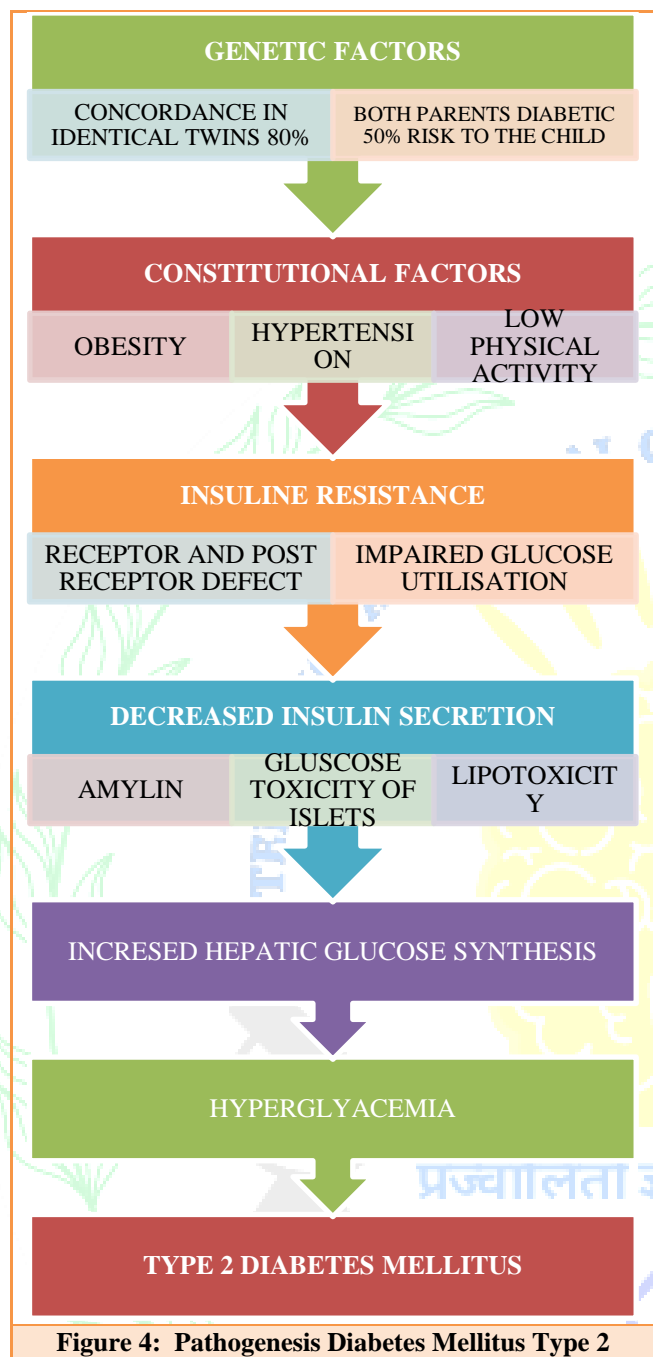


Figure 4: Pathogenesis Diabetes Mellitus Type 2

Complications Of Diabetes: ^[11]

As a consequence of hyperglycemia of diabetes, every tissue and organ of the body undergoes biochemical and structural alterations which account for the major complications in diabetics which may be acute metabolic or chronic systemic. Both types of diabetes mellitus may develop complications which are broadly divided into 2 major groups

1. Acute metabolic complications: These include diabetic ketoacidosis, hyperosmolar non-ketonic coma, and hypoglycemia.
2. Late systemic complications: These are atherosclerosis, diabetic microangiopathy, diabetic nephropathy, diabetic neuropathy, diabetic retinopathy and infections.

Treatment:

Management of type 2 diabetes includes:

1. Diet planning
2. Regular exercise.
3. Weight loss
4. Medication

Diet planning: ^[12]

Diet control is an endogenous insulin preserver. Primary therapeutic goal is weight loss in obese individuals; Reduction in weight eliminates the need for oral hypoglycemic drugs or insulin, especially if normal body weight is achieved. Consistency in composition and timing of meals is important, particularly for patients using fixed insulin regimens or oral hypoglycemic drugs.

- A. Hypocaloric diets: Caloric calculations are done for ideal body weight. Total calories should be kept ideally between 1000 and 1200 kcal/day;
- B. Carbohydrates: Carbohydrate should constitute 50 to 60% of total calories. Concentrated sugars are avoided except in the treatment of hypoglycemia.
- C. Fibers: About 25 gm of fibers per 1000 kcal is advised. Complex high-fiber carbohydrates (bran, whole grain cereals, legumes, vegetables and whole fruit) are recommended.

D. Proteins: The total protein content of the diabetic meal plan should be 25 to 30%.

E. Fats: Total fat content should be between 25 and 30% of total calories. Skimmed or low-fat milk is advised; only 2 to 3 eggs per week are allowed. Margarine should be taken instead of butter. Red and brown meat should be taken in reduced amounts. Fish and skimmed milk-based cheeses can be taken.

Physical activity :

Exercise is important for losing weight or maintaining a healthy weight. It also helps with managing blood sugar. Aerobic exercise such as walking, swimming, biking or running. Adults should aim for 30 minutes or more of moderate aerobic exercise on most days of the week, or at least 150 minutes a week. Resistance training includes weightlifting, yoga. type 2 diabetes patient should aim for 2 to 3 sessions of resistance exercise each week.

Weight loss:

In obese patient weight loss should be most important thing. Diet, physical activity will help to lose weight.

Medications: ^[13]

1) Oral Antidiabetic Agents-

A. Sulfonylureas:

Sulfonylureas act by stimulating release of insulin from the pancreatic β cell. Possible side effects include hypoglycemia and weight gain.

a. Meglitinide

b. Insulin sensitisers:

- Biguanides: The drugs under this group are phenformin and metformin. These are drugs of choice for obese type II diabetes. They have no effect on insulin secretion.

- Thiazolidinediones: They improve insulin sensitivity in muscle, liver and adipose tissue. There is no hypoglycemia, as they do not affect pancreatic insulin secretion. Patients with little pancreatic insulin reserve do not respond adequately.

B. Alpha glucosidase inhibitors:

Delaying digestion and absorption of sucrose and complex carbohydrates may be advantageous. Example: Acarbose and Voglibose

C. Fatty Acid Oxidation Inhibitors (Acipimox):

In Type 2 DM, due to decreased insulin action on adipocytes, excess fatty acids are released. These may stimulate hepatic gluconeogenesis and lead to fasting hyperglycemia. Acipimox, a nicotinic acid derivative (20 times more potent than nicotinic acid), decreases free fatty acid levels. It also lowers fasting hyperglycemia and triglyceride levels.

D. Sitagliptin:

It increases insulin secretion. It lowers glucagon secretion and can be combined with metformin and thiazolidinediones

E. SGLT-Inhibitors:

By inhibiting sodium glucose cotransporter 2, renal glucose

reabsorption is prevented, urinary loss of glucose is promoted and this decreases glucose level in type 2 DM. Example: Dapagliflozin and canagliflozin

2) Principles of Insulin Therapy

Insulin dosage and pattern of administration are adjusted until reasonable control of blood glucose is achieved. Then the frequency of blood glucose monitoring is decreased to 3 to 4 times a day, later once or twice weekly sugar estimation is sufficient.

Discussion:

The concept of *Dhatugat Avastha* is nothing but progression of diseases from macro to micro level biologically. It is clearly mentioned in diseases like *Jwara*, *Kushtha*, *Masurika* and *Vatavyadhi*. Madhumeha being a disease with *Vata* predominancy, shows *Avrittatva* i.e., obscurity in its pathophysiology; however, no obvious description related to it is mentioned in classical texts. Also, its correlation with DM, which comes with group its complications, makes it significant to study and analyse whether any *Ayurvedic* interpretation can be made. Some of the commonly found complications of Type 2 DM and its *Ayurvedic* interpretation can be explained as follows –

Table No. 1. Interpretation of *Rasa Dhatugat avastha*

Complication	Causes	Symptoms	Ayurvedic interpretation
Diabetic ketoacidosis (DKA) ^[14]	Severe lack of insulin causes lipolysis in the adipose tissues, resulting in release of free fatty acids into the plasma.	deep and fast breathing with fruity odour	<i>Mukha daurgandhya</i>
Hypoglycemia	Excessive administration of insulin	Dizziness, fainting, generalized weakness	<i>Daurbalya</i>
Infections	due to impaired leucocyte functions	Susceptibility to various infections like fungal, bacterial and parasitic	<i>Krimi roga</i>

Table No. 2. Interpretation of *Rakta Dhatugat Avastha*

Complication	Causes	Symptoms	Ayurvedic interpretation
Diabetic microangiopathy ^[15]	Due to impaired blood flow	Thickening of vessels in skin, skeletal muscles	<i>Dhamani upalepa</i>
Diabetic retinopathy	Lesions involving retinal vessels	Blindness	<i>Drishtimandya</i>

Table No. 3. Interpretation of *Mamsa Dhatugat avastha*

Complication	Causes	Symptoms	Ayurvedic interpretation
Diabetic gangrene of foot ^[16]	Trauma, Lack of blood flow to tissues with or without infection	Ulceration, deformation of foot (Charcot foot) and amputation)	<i>Pramehaaj vrana</i>
Diabetic dermopathy ^[17]	Previous trauma	Pigmented round or oval spots (Shin spots)	<i>Pramehaa pidaka</i>

Table No. 4. Interpretation of *Meda Dhatugat Avastha*

Complication	Causes	Symptoms	Ayurvedic interpretation
Atherosclerosis, Embolism	Due to recurrent hyperglycemia that causes increased glycosylation of hemoglobin and other proteins, building up of plaque in inner lining of vessels	coronary artery disease, silent myocardial infarction, cerebral stroke	Dhamani pratichaya
Dyslipidemia	Disturbance in production and clearance of plasma lipoproteins	Shortness of breath, cardiovascular disease	Sthaulya
Diabetes nephropathy [18]	Hyperglycemia with hypertension	Renal involvement (Diabetic glomerulosclerosis, atheroma of renal arteries, Diabetic pyelonephritis, Tubular lesions)	Vrukka Amaya

Table No. 5 Interpretation of *Asthi Dhatugat Avastha*

Complication	Causes	Symptoms	Ayurvedic interpretation
Osteoporosis	Decrease in function of osteoblast leading to accelerated bone loss	Back pain, spine malformation	Asthi saushirya

Table No. 6. Interpretation of *Majja Dhatugat Avastha*

Complication	Causes	Symptoms	Ayurvedic interpretation
Diabetic neuropathy [19]	Due to accumulation of sorbitol and fructose as a result of hyperglycemia leading to deficiency of myoinositol	Tingling or burning sensation especially in extremities	Kara pada daha and suptata
Hyperosmolar hyperglycemic coma	Severe dehydration resulting from sustained hyperglycemic diuresis	Loss of consciousness, confusion, dehydration	Murccha, Sanyasa

Table No. 7 Interpretation of *Shukra Dhatugat avastha*

Complication	Causes	Symptoms	Ayurvedic interpretation
Infertility/ Impotency	Hyperglycemia leads to increase in oxidative stress and DNA damage	Male: oligospermia or azoospermia Female: disturbed menstrual cycle	Vandhyatva / Klaibya

As described above, each *Dhatu* when gets vitiated & develop its own group of symptoms that can be correlated accurately with contemporary complications of persistent hyperglycaemia. Thus, *Dhatugat Avastha* can be seen commonly occurring in patients of *Madhumeha* or DM and need to have proper line of treatment that avoids progression of disease and impairment of tissues.

Conclusion:

Therefore, study of *Dhatugat Avastha* in *Madhumeha* and its correlation with type 2 DM not only help to frame precise pathophysiology and severity of disease for that particular individual but also guide in selection of drug and regimen to be

executed for that particular individual. As most of death occurring due to diabetes are seen in patients with diabetic complications, this study can help to control both morbidity and mortality rate of DM by implication of diagnosis and prognosis. Insulin resistance playing the major role in succession of disease, can be annihilated by diagnosing the *Dhatugat Avastha* of disease which can further enlighten physician to build appropriate line of treatment. Hence, the study of *Dhatugat Avastha* in *Madhumeha* and its correlation with complication of DM can improvise physicians skill of diagnosis and prognosis of disease, by controlling the chances of advancement of disease to complications and can help to elevate the life expectancy of patients suffering from DM.

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ISSN: 2584-2757

DOI : 10.5281/zenodo.13936881

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