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## Conceptual descriptive study of Mamsadhatvagni as Insulin W.S.R. to insulin resistance

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### Abstract

High blood glucose (or blood sugar) levels are a hallmark of diabetes, a chronic metabolic disease that over time causes major harm to the heart, blood vessels, eyes, kidneys, and nerves. Type 2 diabetes is the most prevalent and typically affects adults. It is brought on by the body either not producing enough insulin or becoming resistant to it. In nations of all income levels, the prevalence of type 2 diabetes has sharply increased during the last three decades. Type 2 diabetes and its complications constitute a major world-wide public health problem, the prevalence of type 2 diabetes has been increasing exponentially and a high prevalence rate has been observed in developing countries. Multiple risk factors of diabetes, delayed diagnosis, Life threatening complications, failure of therapies of this disease make it necessary to develop efficient therapy strategies and appropriate prevention measures for the disease. Insulin resistance is a state of reduced insulin sensitivity and inability of insulin to lower plasma glucose levels through suppression of hepatic glucose production and stimulation of glucose utilization in skeletal muscles and adipose tissues. Ayurveda is a science, which will help in lowering the insulin resistance. Mamsa Dhatu is one of the main Dushya in case of Prameha. Prameha can be correlated with Diabetes in Modern science. So present study is an attempt to study mamsadhatvagni as Insulin W.S.R. to Insulin Resistance.

**Keywords:** Diabetes, insulin, Resistance, mamsadhatvagni

### Introduction

In spite of all sorts of advancements of science, in this world, man is not able to sail himself in the boat of happy & healthy life. Unnatural ways of life style, increased population and moreover world of machines has created unlimited desires in human mind on the one hand, while on the other hand, it has originated anxiety, anger, hostility & grief directly or indirectly. So many diseases are there which are output of unnatural dietary habits, restless lifestyle and stress, one of such is diabetes.

One metabolic disease that is now plaguing the world is diabetes mellitus <sup>[1]</sup>. Over 371 million persons worldwide had diabetes in 2012 (a prevalence of 8.3%), with type 2 diabetes accounting for more than 90% of all cases <sup>[2]</sup>. By 2030, this population is predicted to rise by over 552 million adults (prevalence of 9.9%) <sup>[3]</sup>. India leads with largest number of diabetes and become diabetes capital of world. Diabetes is fast gaining the status of potential epidemic in India with more than 62 million diabetic individuals currently diagnosed with the disease <sup>[4]</sup>. Type 2 diabetes is a complex and progressive disease characterized by various metabolic defects. Many patients with type 2 diabetes have hyperglycemia as a result of deficiencies in both insulin secretion and insulin resistance. Insulin resistance is a state of reduced insulin sensitivity and inability of insulin to lower plasma glucose levels through suppression of hepatic glucose production and stimulation of glucose utilization in skeletal muscles and adipose tissues.

There is a gap to overcome insulin resistance. In Ayurveda Prameha Vyadhi has similarity with diabetes mellitus. Prameha contains mamsa as a prime dushya in pathogenesis. So it is essential to study Mamsadhatvagni in Diabetes and its relation with Insulin resistance.

### Aims

To study conceptually Mamsadhatvagni as Insulin W.S.R. to Insulin Resistance.

### Objective

1. To take various references related to Mamsadhatvagni.
2. To study Insulin Resistance.
3. To Study Mamsadhatvagni as Insulin W.S.R. to Insulin Resistance

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## Materials and Methods

Literature review is done through all available texts, various research papers available in Journals and online data available.

## Review of Literature

### Diabetes Mellitus

Diabetes mellitus is a syndrome with disordered metabolism and inappropriate hyperglycemia, due to either a deficiency of insulin secretion or to a combination of insulin resistance and inadequate insulin secretion to compensate. The term diabetes was originally introduced to describe the clinical symptoms associated with unduly high glucose levels. Diagnostic emphasis then shifted to the glucose levels themselves and in addition to diabetes a milder level of hyperglycemia denoted impair glucose tolerance has been defined by the W.H.O.

### Essential of Diagnosis

#### Type - I diabetes

- Polyuria, polydipsia, and rapid weight loss associated with random plasma glucose >200 mg/dl.
- Plasma glucose of 126 mg/dl or higher after an overnight fast, documented on more than one occasion.
- Ketonemia and ketonuria or both.

#### Type - II diabetes

- Most patient are over 40 year of age and obese.
- Polyuria and polydipsia, ketonuria and weight loss generally are uncommon at the time of diagnosis. Candidal vaginitis in women may an initial manifestation, many patient have few or no symptoms.
- Plasma glucose of 126 mg/dl or higher after an overnight fast on more than one occasion after 75 gm oral glucose, diagnosis values are 200 mg/dl or more. 2 hrs after the oral dose. Hypertension, dyslipidemia and atherosclerosis are often associated.

### Metabolic changes in Diabetes mellitus

#### 1. Hyperglycaemia Occurs as a result of

- Decreased and impaired transport and uptake of glucose into muscles and adipose tissue.
- Repression of key glycolytic enzymes like Glucokinase, phosphofructokinase and pyruvate kinase takes place.
- Derepression of key gluconeogenic enzymes like, Pyruvate carboxylase, phosphoenol pyruvate carboxykinase, fructose biphosphatase and glucose-6-phosphatase occur, promoting gluconeogenesis in Liver. This further contributes to hyperglycemia.
- Elevated amino acid level in the blood particularly ananine provides fuel for gluconeogenesis in Liver.

#### Amino Acids Level

- Transport and uptake of amino acids in peripheral tissues is also depressed causing an elevated circulating level of amino acids, particularly alanine. Glucocorticoid activity predominate having catabolic action on peripheral tissue proteins, releasing more amino acids in blood.
- Amino acids breakdown in Liver results in increased production of urea N.

#### Protein Synthesis

Protein synthesis is decreased in all tissues due to

- Decreased production of ATP.
- Absolute or relative deficiency of Insulin.

### Insulin Resistance <sup>[5]</sup>

Insulin resistance is when cells in muscles, fat, and liver don't respond well to insulin and can't use glucose from blood for energy. To make up for it, pancreas makes more insulin. Over time, blood sugar levels go up. Insulin resistance syndrome includes a group of problems like obesity, high blood pressure, high cholesterol, and type 2 diabetes.

### Symptoms of Insulin Resistance

Some signs of insulin resistance include

- A waistline over 40 inches in men and 35 inches in women
- Blood pressure readings of 130/80 mg/dL or higher
- A fasting glucose level over 100 mg/dL
- A fasting triglyceride level over 150 mg/dL
- A HDL cholesterol level under 40 mg/dL in men and 50 mg/dL in women
- Skin tags
- Patches of dark, velvety skin called acanthosis nigricans

### Risk Factors and Causes of Insulin Resistance

Things that can make this condition more likely include:

- Obesity, especially belly fat
- Inactive lifestyle
- Diet high in carbohydrates
- Gestational diabetes
- Health conditions like non-alcoholic fatty liver disease and polycystic ovary syndrome

### How Insulin Resistance Progresses to Type 2 Diabetes

When there is insulin resistance, pancreas makes extra insulin to make up for it. For a while, this will work and blood sugar levels will stay normal. Over time, though, pancreas won't be able to keep up. If subject don't make changes in the way he eat and exercise, his blood sugar levels will rise until he have prediabetes.

### Complications of Insulin Resistance

If metabolic syndrome goes untreated, it could lead to:

- Severe high blood sugar
- Severe low blood sugar
- Heart attack
- Stroke
- Kidney disease
- Eye problems
- Cancer
- Alzheimer's Disease

### Prameha

Prameha is caused by eating heavy, oily, sour, salty food stuffs and cereals of recent crop in excess. In addition, excessive sleep, comfort life, avoidance of exercise, failure to take Shodhana karmas leads to increase in Kapha, Pitta, Meda and Mamsa. They obstruct the natural path of Vata. The increased and irritated Vata gives rise to tissue damage. The waste products with Oja are passed in urine giving rise to Prameha. Due to erratic increase and decrease of obstructed Vata, the severity of clinical manifestation shows fluctuations, being moderate sometimes and severe at other. The nature of clinical manifestation also changes frequently indicating dominance of Vata, Pitta and Kapha at different times <sup>[6]</sup>.

### Samprapti Ghataka <sup>[7]</sup>

Samprapti of Prameha can be summarized as

- Dosha - Tridosha – Vata, Pitta, Kapha
- Main – Kapha [ bahudrava shleshma ]
- Dushyas - Rasa, Rakta, Mamsa, Meda, Majja, Shukra, Oja, Vasa,
- Lasika, Ambu
- Main- Meda, Mamsa, Kleda
- Srotasas - Mutravaha
- Medovaha
- Udakavaha
- Mamsavaha
- Srotodushti type - Atipravritti
- Vimargamana
- Sanga
- Udbhava sthana – Amashaya
- Vyakti sthana – Mutra marga
- Marga – Madhyama marga
- Agni – Jatharagni and dhatwagni mandya
- Swabhava – Chirkari

### Mamsadhatvagni and Insulin Resistance

One of the main Dushya described by Charaka is Mamsa Dhatu<sup>[8]</sup>. He narrated it especially in Kaphaja Prameha and Avaranjanya Madhumeha<sup>[9]</sup>. Mamsa and Kapha having same qualities. They both give strength to the body. When get vitiated, Mamsa losses its normal consistency and develops Shaithilya and provide space in between for the accumulation of morbid matter. That inturn results into the Putimamsa Pidika<sup>[10]</sup>. "Mamsaleshu Arakasheshu"<sup>[11]</sup>. Mamsa dushti can be compared to deranged protein metabolism which is an integral part of Diabetes Mellitus. Lack of insulin depresses transport and uptake of amino acids in periferal tissue leads to elevated circulating amino acids in extra cellular space particularly alanine. Glucocorticoid activity predominate having catabolic action on peripheral tissue protein releaving more amino acids in Blood. Amino acids breakdown in liver results in increased production of urea N these free amino acids can be compared with abadha mamsa. Putimamasa and pidaka are the morbid states of mamsa dhatu.

Two major changes takes place in mamsa dhatu these are protein degradation and reduction in its blood supply, both these along with elevated blood sugar level form a favorable media for the growth and multiplication of the microorganism. The results are putrefaction and evolution of multiple septic foci in mamsa dhatu. Diminished protein synthesis hampers the healing process and these complications adopt chronic course. This lack of Insulin is due to insulin resistance resulted from mamasa dushti. Mamsa Dushti is caused due to mamsa Dhatagnimandya. Also vitiation of meda is seen In Prameha. Meda dhatu is produced by action of mamsadhatvagni as mamsa dhatu is precursor of it. So there is a relation between mamsa Dhatagnimandya as Insulin resistance in Diabetes.

### Discussion and Conclusion

Diabetes mellitus is characterized by abnormal metabolism and unwarranted hyperglycemia, which can be caused by either insufficient insulin secretion or a combination of insulin resistance and insufficient insulin production to make up for it. When the term diabetes was first coined, it was used to refer to the clinical signs and symptoms of abnormally elevated blood glucose levels. Insulin resistance and insulin secretion deficits cause hyperglycemia in many type 2 diabetic individuals. Insulin resistance is characterized by decreased insulin sensitivity and the inability of insulin to decrease plasma glucose levels by stimulating the use of

glucose in skeletal muscles and adipose tissues and suppressing the synthesis of glucose in the liver.

one of the primary Dushyas that Charaka describes. In particular, he told it in Avaranjanya Madhumeha and Kaphaja Prameha. Kapha and Mamsa share the same traits. The body gains power from both of them. When Mamsa becomes vitiated, it loses its natural consistency, produces Shaithilya, and creates gaps for the buildup of morbid material. Consequently, the Putimamsa Pidika is the outcome. "Mamsaleshu Arakasheshu" Deranged protein metabolism, a key component of diabetes mellitus, is comparable to mamsa dushti. Increased levels of circulating amino acids, especially alanine, in extracellular space result from decreased transport and uptake of amino acids in periferal tissue caused by a lack of insulin. More amino acids are left in the blood as a result of the catabolic impact of glucocorticoid activity on peripheral tissue proteins. When the liver breaks down amino acids, more urea N is produced; these free amino acids are comparable to abadha mamsa. Mamsa Dhatu's morbid states are putimamasa and pidaka.

Mamsa dhatu undergoes two significant changes: the breakdown of proteins and a decrease in blood flow. These two factors, together with an increased blood sugar level, create an environment that is conducive to the microorganism's growth and reproduction. Putrefaction and the development of several septic foci in Mamsa Dhatu are the outcomes. The healing process is hampered by reduced protein synthesis, and these issues take a chronic form. The cause of this insulin shortage is insulin resistance brought on by mamasa dushti. Mamsa Dhatagnimandya is the cause of Mamsa Dushti. Prameha also exhibits meda vitiation. Since mamsa dhatu is a forerunner to mamsa dhatu, mamsa dhatu is created by the activity of mamsadhatvagni. Thus, Mamsa Dhatagnimandya and insulin resistance in diabetes are related.

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