

Prameha: Classification, Aetiology and Pathogenesis

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Abstract: The classical texts of *Ayurveda* has described *Prameha* as a group of disorders of the urinary system. Each sub type of *Prameha* has been defined on specific characteristics of abnormal urine. Classification of *Prameha* is based on different perspectives such as Genetics, Environmental Factors, Behavioural Changes and Food Habits. Nosology of diseases has been made on the basis of pathophysiology, manifestation of clinical features, and characteristics of the abnormal urine. Each sub type is, therefore, not identical with the conditions mentioned in the classification of diseases in Modern Medicine. For instance, the view of many scholars that the Diabetes Mellitus as *Madhumeha*, is an incorrect interpretation because *Madhumeha* does not represent entire clinical course of Diabetes Mellitus. *Madhumeha* is a fatal condition, which represents a particular stage of Diabetes Mellitus and other diseases of the Kidney. The pathogenesis of *prameha* is described on the basis of *Doṣa – Dhātu – Mala* Theory. Early stage of the disease manifests clinically due to the vitiation of *Kapha* predominantly. Gradual development of the disease may occur manifesting the features of vitiated *Pitta* and *Vāta* on the influence of aggravating factors and inadequate attention in the management.

Introduction

Ayurveda mentions three major vital places of the body as *Trimarma*, which includes *Hṛdaya*, *Śīrṣa* and *Vasti*. *Prameha*, which is a group of diseases of *Vasti* (Urinary System) is characterized by excessive passing of turbid urine.

The term "*Prameha*" is derived from the root of Sanskrit language "*Mih – Kṣarane*", which means passing of urine. The prefix "*Pra*" stands for excessiveness. Therefore, the term "*Prameha*" literally stands for excessive passing of urine¹¹. Excessive passing of urine – *Prabhū tamutratā* and the Turbidity of urine – "*Āvilamū tratā*" are main characteristic features of "*Prameha*". Therefore, the condition "*Prameha*" can be basically defined as "**a group of diseases of any cause, which manifests excessive passing of urine with or without turbidity of urine**".

The Classification of Prameha

Prameha is included in the category of *Mahārōga*, which consists of the most fatal conditions

that are incurable - (Su.Ci.14.11)². Classification of *Prameha* has been made on the basis of quantitative and qualitative analysis of urine. The classical texts of *Ayurveda*, *Carakasamhitā*, *Suśrutasamhitā* and *Aṣṭhā ṅgahrdayasamhitā* mention the 20 sub - types of *Prameha* and different technical terms have been used in the nosology of few conditions - (CS.Ni.4.3⁸, CS.Ci.6.6¹, SS.Ni.6.26², AS Ni 10.8³). On the aetiological basis, *Prameha* is divided into two categories as Congenital (*Prakṛtija*) and Acquired (*Svakṛta*)⁹. The congenital type of *Prameha* is caused by hereditary and nonhereditary defects of the ovum and sperm -(SS.Ci.11.03⁷).

On the basis of pathophysiology, all types of *Prameha* are the results of vitiation of *tridoṣa* and they are categorized into three groups namely *Kaphajaprameha*, *Pittajaprameha* and *Vātajaprameha* according to the predominant *dōṣa* - (CS.Ni.4.3⁸, SS.Ni.6⁷) and each category is divided into sub types on the basis of the characteristics of urine.

Aṣṭhāṅgahṛdayasaṁhitā does not refer to the conditions such as *Ikṣubālikārasameha*, *Sāndraprasādameha*, *Śuklameha*, *Ālālameha*, *Lavaṇameha*, but it refers to the terms *Ikṣumeha*, *Sāndrameha*, *Lālāmeha*. *Śoṇitameha* has been replaced by *Raktameha*, a synonym of *Śoṇitameha* in addition to the other types of *Pittajaprimeha* in *Carakasamhitā*. *Aṣṭhāṅgahṛdayasaṁhitā* has followed the *Carakasamhitā* in classifying the *Vātaja Primeha*.

Kaphaja Primeha

Kaphajaprimeha, which includes ten types of *Primeha* namely *Udakameha*, *Ikṣubālikārasameha* (*Ikṣumeha*), *Sāndrameha*, *Sāndraprasādameha*, *Śuklameha*, *Śukrameha*, *Śītameha*, *Śanairmeha*, *Sikatāmeha*, and *Lālāmeha* - (CS.Su.19.3.9¹, CS.Ni.4.10²). *Suśruta* refers to the terms *Piṣṭameha*, *Surāmeha*, *Lavaṇameha* and *Pherameha* - (SS.Ni.6.10^{2.7}) instead of *Sāndraprasādameha*, *Śuklameha*, *Śītameha*, *Ālālameha* of *Carakasamhitā* while *Aṣṭhāṅgahṛdayasaṁhitā* refers to *Udakameha*, *Ikṣumeha*, *Sāndrameha*, *Śukrameha*, *Śītameha*, *Śanairmeha*, *Sikatāmeha*, *Piṣṭameha*, *Surāmeha* and *Lālāmeha* - (AHS.Ni.10.8-13³).

Pittaja Primeha

Pittaja Primeha, which includes six types of *Primeha*, namely *Kṣārameha*, *Kālameha*, *Nīlameha*, *Lōhitameha*, *Māñjiṣṭameha* and *Hāridrameha* - (CS.Su.19.12¹³, CS.Ni.4.25¹³). *Suśruta* refers to the terms *Amlameha* and *Śoṇitameha* (SS.Ni.6.11^{2.7}) instead of *Kālameha* and *Lōhitameha* of *Carakasamhitā*, while *Aṣṭhāṅgahṛdayasaṁhitā* has followed the *Carakasamhitā* but *Lōhitameha* has been replaced by *Śoṇitameha* of *Suśrutasaṁhitā* - (AHS.Ni.10.14-15³).

Vātaja Primeha

Carakasamhitā includes four types of *Vātaja Primeha*, namely *Vasāmeha*, *Majjāmeha*, *Hastimeha* and *Madhumeha* - (CS.Su.19.12¹, CS.Ni.4.9¹, CS.Ci.6.7¹). *Suśrutasaṁhitā* refers to the terms *Sarpirmeha* and *Kṣaudrameha* - (SS.Ni.6.12^{2.7}) instead of *Majjāmeha* and *Madhumeha* of *Carakasamhitā* while *Aṣṭhāṅgahṛdayasaṁhitā* has followed *Carakasamhitā* (AHS Ni 10.16 -18³).

Aetiology of Primeha

Origination of *Primeha* is symbolically expressed in *Carakasamhitā* as it occurred due to excessive drinking of Ghee (*Haviṣa*) when the Lord *Dakṣa* was destroying the sacrifice - (CS.Ni.8.11^{1.8}). The aetiological factors mentioned in classical texts are common for all types of *Primeha*. Aetiological factors can be classified according to the nature of effect on the kidney. *Suśrutasaṁhitā* has emphasized two categories: Hereditary and Acquired. Hereditary causes include the defects of *Bīja* (Sperm or Ovum). Acquired causes of *Primeha* include inappropriate food and life style - (SS.Ci.11.03²).

Genetic Factors

Suśrutasaṁhitā has identified the genetic involvement in pathogenesis of *Primeha* - (SS.Ci.11.03²). *Carakasamhitā* mentions that, in describing the prognosis of *Primeha*, genetic involvement of the disease is a cause of poor prognosis. Further *Cakrapāṇidatta*, the great commentator of *Carakasamhitā*, also elaborates that the *Primeha* may be hereditary or congenital due to defects of *Bīja* (Sperm or Ovum) - (CS.Ci.6.57⁸).

Carakasamhitā states that congenital type of diseases can occur due to defect in *bīja*, *bījabhāga* or *bījabhāgāvayavā* (CS.Sa.4.30⁸). The *bīja*, *bījabhāga* and *bījabhāgāvayava* can be compared with Ovum and Sperm, Chromosomes and Genes respectively. *Cakrapāṇidatta* comments that this defect is due to the indulgence in inappropriate foods at the time of pregnancy. *Carakasamhitā* further states that excessive use of sweet taste during pregnancy may cause birth to a child affected with *Primeha* and obesity (CS.Sa.8.21⁸). Genetic influence and factors that affect the foetal nutrition are the primary causes of *Primeha*. In comparison to the modern medicine, Diabetes Mellitus is a leading disease, which shows abnormalities in the urine and causes renal damage. Genetics involvement is accepted as a significant aetiological factor – Level “A” evidence⁴ Monogenic forms and susceptibility genes have also been identified in both forms of Diabetes Mellitus Type 1 and Type 2.

Non - Genetic Factors

Nutrition:

Epidemiological studies have reported a higher incidence of Type 2 Diabetes Mellitus in subjects with a low birth weight. The hypothesis that nutrition of the mother can profoundly affect the metabolic outcome of the offspring has been confirmed by elegant mechanistic animal studies. Low birth weight is accepted as a significant aetiological factor – Level “A” evidence. Poor nourishment of the foetus increases the risk of metabolic syndrome and Type 2 Diabetes Mellitus and postnatal over – nutrition may aggravate the syndrome⁴.

Food Habits

Excessive utility of foods that increases body weight, fat content of the body (CS.Ni.4.14¹) and foods that are acid, salt - (CS.Su.17.38¹) and sweet - (SS.Ni.6.3⁷) in taste are main causes of *Prameha*.

Excessive utility of food that possesses the properties such as *Śīta* and *Snigdha* - (SS.Ni.6.3⁷) and rice prepared from recent harvest, water obtained from recent rain, lead to increase the constituents such as *Śleṣma*, *Pitta*, *Medas* and *Māṃsa* - (CS.Su.17.38¹). These conditions affect the proper function of *vāta*. The vitiated *vāta* attracts *ōja* and propels it into *vasti*, which causes *Madhumeha* (CS.Su.17.38¹, CS.Su.17.78-82¹), which is the most difficult to cure and is the fatal state of the clinical course of *Prameha*.

Excessive use of food that are sweet in taste, excessive use of rice obtained from recent harvest, recently prepared alcohol, meats obtained from terrestrial animals (*Ānūpa*) and aquatic animals (*Audaka*) and dairy products, sweets prepared from Jaggery and *Piṣṭaka* (foods prepared from flour) etc are the causes of over nutrition (CS.Su.23.2¹).

According to the modern research, which confirms the facts mentioned in ancient Ayurvedic texts, high frequency of intake of foods rich in carbohydrate, protein or nitrosamine compounds too will increase the

risk of insulin dependant diabetes in human⁶. Proteins from cows' milk may trigger the autoimmune response that destroys Beta cells of pancreas in laboratory rats. It has been suggested that proteins in cows' milk are also risk factors for human diabetes¹². Children who develop diabetes are often breast fed for a shorter period¹⁰.

Behaviour

Excessive sleeping, desire for sleeping during the day time, indulgence in long-term sitting, lack of exercise (sedentary life style) - (CS.Ni.4.14¹), lack of thinking, lack of medicinal purifications, desire for *Prameha Piṣṭakā* - (CS.Su.17.3-4¹, CS.Su.17.38¹, CS.Su.23.2¹, SS.Ni.6.3⁷), in addition to, *Kota*, *Kaṇḍu*, *Pāṇḍu*, *Jvara*, *Kuṣṭha*, *Visūcika* derived from *Āma*, *Mūtrakcchra*, *Arocaka*, *Tandrā*, *Dvajabhaṅga*, *Atistūlatā* (Obesity), Lassiness, Heaviness of the body, *Indriyas* and *Srotas* filled with *Mala*, Difficulty in concentration of mind, Thoughtfulness, Oedema and other related conditions - (CS.Su.23.2¹).

Secondary Causes of *Prameha*

Obesity

Obesity can act as a secondary cause in the genesis of *Prameha* - (CS.Ni.4.14¹). Obesity and Leanness depend on the state of *Rasa* (*Nutrients*). Excessive use of food that cause the increase of *Kapha*, excessive repetition of intake of meal, absence of exercises and sleeping during the day time are the reasons of obesity, which leads to serious complications such as *Prameha*, *Vidradhi*, *Piṣṭakā*, *Svāsa* and *Vātavyādhi* etc - (SS.Su.15.38⁷).

Modern investigations show that there is global epidemic of obesity affecting all ages and is associated with insulin resistance, impaired glucose tolerance and cardiovascular diseases. Physical inactivity is independently associated with increased insulin resistance. Lifestyle changes in subjects with impaired glucose tolerance decreases progression to Diabetes

Mellitus. Physical inactivity has also been accepted as a significant aetiological factor – Level “A” evidence⁴.

Functional and Organic Defects of Urinary System

The retroward action of *Vāta* due to the functional and organic defects of urinary system (*Vasti*) leading to urinary retention cause *Prameha*, *Mūtradoṣa* (abnormalities of urine), *Śukradoṣa* (abnormalities of semen and seminal fluid), *Mūtraghāta* (obstructions of the urinary system) - (SS.Ni.3.27²). *Aśmarī* (urinary calculi) too is one of the leading causes of *Prameha* specially *Sikatāmeha*, *Sarkarāmeha* and *Bhaṣmākhyameha* (SS.Ni.3.13-15²).

Stress

Evidences from animal studies and mechanistic studies suggest a relationship between stress and insulin resistance with predisposition to Type 2 Diabetes Mellitus and it has been accepted as an aetiological factor – Level “B” evidence (Partial acceptance subject to confirmation⁴).

Iatrogenic Causes of *Prameha*

Administration of medical procedures and medicines, which are liable to cause renal damage may produce *Prameha*. Indication of *Dhāraka Auśadha* (Antidiarrhoeal Drugs) is an example - (Su.Ut.40.29 – 30²). According to modern investigations, many chemicals, which are administered as medicine, are identified as causes of renal damage.

Aetiology of *Śleṣmaja Prameha*

Carakasamhitā refers to the specific aetiology in respect to the major categories of *Prameha*. Food and changes in lifestyle are the predominant causes of *Kaphaja Prameha*, in which *Ikṣumeha* is included. According to *Carakasamhitā*, aetiology of *Śleṣmaja Prameha* includes;

- Excessive utility of cereals such as *Hayānaka*, *Yavaka*, *Cīnaka*, *Uddālaka*,

Naiṣada, *Itkata*, *Mukundaka*, *Mahāvrihi*, *Pramodaka* and *Sugandhaka* (CS.Ni.4.5⁸).

- Excessive utility of food prepared from *Hareṇu* obtained from recent harvest, Juice of *Māṣa* with Ghee, meats obtained from domestic animals, aquatic animals and animals of marshy lands, *sāka*, food prepared from gingelly and flour (*Piṣṭaka*), Dairy products, *Kuṣara*, *Vilepi*, food prepared from sugar cane, curd which is not prepared properly, liquids and sweets etc - (CS.Ni.4.5⁸).
- Absence from physical exercise and massages, excessive sleeping, long term sitting and others, which increase *Meda* and urine - (CS.Ni.4.5⁸).

These factors play a major role in the pathogenesis of *Ikṣumeha* and modern investigations also accept the sedantory life style as an aetiological factor of Diabetes Mellitus Type 2.

Aetiology of *Pittaja Prameha*

Aetiology of *Pittaja Prameha* includes

- Excessive use of material, which possess the qualities such as *Uṣṇa*, *Amla*, *Lavaṇa*, *Kṣāra*, *Kaṭuka* and *Tīkṣṇa*,
- Use of inappropriately prepared food or food that are liable to inappropriate digestion; use of incompatible food, which cause the aggravation of *pitta*
- Excessive exposure to sunlight and heat; excessive exertion and anger - (CS.Ni.4.7¹).

These aetiological factors may cause damages of the kidney directly or indirectly.

Aetiology of Vātaja Prameha

Aetiology of Vātaja Prameha includes;

- Excessive use of material, which possess the qualities such as *kaṣāya kaṭu, tikta, rūkṣa, laghu, śīta*;
- Excessive indulgence of sexuality and exertion, excessive exposure to sunlight, uncontrolled feelings, sorrow, keeping awake at night, inappropriate postures of the body, refrains from natural urges and trauma; Excessive administration of Emesis, Purgation, *Āsthāpana* type of enema and *Śirovirecana*, fasting, and excessive bloodletting;

These factors will aggravate the *Vāta* - (CS.Ni.4.9¹) especially *Vyāna* and *Apāna*, causing *Prameha* and *Śukradoṣa*- (SS.Ni.1.20⁷).

Pathogenesis

The aetiological factors mentioned above lead to increase the body constituents such as *Śeṣma*, *Pitta*, *Meda* and *Māṃsa*, which will make the person fatty, weight gained and increase the viscosity of body - (CS.Su.17.38¹, CS.Su.23.2¹, SS.Ni.6.3⁷). The vitiated *doṣa* produces diseases according to the places, where they deposit and the *Prameha* occurs due to the deposition of vitiated *doṣa* in *Vasti* - (SS.Su.21.33⁷).

Pathogenesis of Śeṣmaja Prameha

Increased *Śeṣma* due to the influence of respective aetiological factors (*Nidāna*) will vitiate *doṣa* and affect the *dūṣya* (Tissues). The vitiated *Śeṣma* will disseminate throughout the body and amalgamate with *Meda*, *Kleda* and *Māṃsa*, which lead to generate gangrenes (*Pūtimāṃsaja Piḍakā*) such as *Śarāvīkā*, *Kacchapīkā* etc. The contaminated *Kleda* is converted into urine, which consists of the characteristics of vitiated *Śeṣma*. Vitiated *Meda* and *Kleda* affect the urinary system obstructing the channels. *Śeṣmaja Prameha* includes ten sub-types classified on the basis of characteristics of urine.

The characteristics, which are similar to those of *Śeṣma*, includes whiteness, coldness, hardness, viscousness, clearness, smoothness, heaviness, sweetness, ability to separate into two layers as condensed and clear and the unpleasant smell of urine - (CS.Ni.4.5¹). At the initial stage of the disease, *doṣa* will not be properly metabolized. The unmetabolized *dōṣa* amalgamate with *Meda* - (SS.Ni.6.4⁷) and propel into the channels carrying urine, which flow downward to excrete through the opening of *Vasti* (SS.Ni.6.4⁷). Any type of *Kaphaja Prameha* can arise at this stage.

Generally all the three *dōṣa*, which involve in genesis of *Prameha*, affect the constituents such as *Meda*, *Rakta*, *Śukra*, *Ambu*, *Vasā*, *Lasikā*, *Majjā*, *Rasa*, *Ōja*, and *Māṃsa* of *Vasti* - (CS.Ci.6.6, CS.Ci.6.8¹). *Dōṣa*, which enters the *vasti*, contaminates urine and produces *Prameha* - (CS.Ci.6.4¹). Predominance of vitiated *doṣa* in *Kaphaja Pramehas* is *Kapha* and the mainly affected *dūṣya* is *Meda*. All sub-types of *Kaphaja Prameha* occur due to the amalgamation of vitiated *Kapha*, *Vāta* and *Pitta* with *Meda* - (Su.Ni.6.9⁷).

Pathogenesis of Pittaja Prameha

This is the second stage of *Prameha*, where the paths are obstructed by *Meda* causing the impairment of proper functions of *vāta*, which increases the function of *Agni* (*Tīkṣṇāgni*) and results in dryness of food and swift digestion - (CS.Su.21.5-7, CS.Ni.4.7¹). *Pittaja Prameha* occurs due to the amalgamation of vitiated *pitta*, *vāta* and *kapha* with *dūṣya* such as blood - (SS.Ni.6.9⁷, CS.Su.24.5¹) and *Meda* - (SS.Ni.6.9⁷). *Pittaja Prameha* includes the six sub-types on the basis of characteristics of urine, which are similar to those of *pitta* such as alkalinity, acidity, salty, pungentness, *uṣṇa*, and smell of raw flesh (CS.Ni.4.7¹).

Pathogenesis of Vātaja Prameha

This is the tertiary stage of the *Prameha*. The person, who has excessive fat, will be broken down as fire burns forest, causing various types of complications - (CS.Su.21.5-7¹).

In comparison to Diabetes Mellitus, breakdown of fat occurs at this stage causing diabetic ketoacidosis. The vitiated *vāta*, disseminated through out the body bringing the lymph into the channels of urine, produces *Vasāmeha*. When *vāta* brings *Majjā*, *Lasikā* (Tissue fluids) and *Ōja* into urine, it produces *Majjāmeha*, *Hastimeha* and *Madhumeha* respectively (CS.Ni.4.9¹).

Hastimeha will excrete excessive volume of urine very slowly but it remains residual of urine in the bladder because of vitiated *Vāta* - (CS.Ni.4.9¹). Probably it may be due to the defects of neurogenic control on bladder.

Fatal conditions such as *Jvara*, *Piḍakā* and *Bhagandarā* occur in the case of excessive growth of fat due to the influence of vitiated *vāta* and *Vātaja Prameha* also arises - (CS.Su.21.5-7¹). *Vātaja Prameha* occurs due to the amalgamation of vitiated *vāta*, *kapha* and *pitta* with *Vasā*, *Majjā* and *Meda* - (SS.Ni.6.9⁷). The vitiated *vāta* also attracts *Ōja* and propels it into *vasti*, which causes *Madhumeha*, the final and the most serious stage, which is difficult to cure - (CS.Su.17.38¹). All types of *Prameha* lead to *Madhumeha* due to lack of management (SS.Ni.6.27⁷).

In conclusion, *Śeṣmaja*, *Pittaja*, and *Vātaja Prameha* represent three clinical stages of renal damage. *Śeṣmaja Prameha* is the initial stage, where the function of kidney is impaired mildly. *Pittaja Prameha*, the second clinical stage of *Prameha*, shows moderately impaired renal functions and at the third stage, the *Vātaja Prameha*, renal functions are affected severely. In comparison, Diabetes Mellitus passes these three clinical stages during its clinical course. The stage of impaired glucose tolerance, which may show polyuria without sugars in urine, can be included in *Udakameha*. The stage of impaired glucose tolerance, which shows polyuria and glycosuria, are included in *Ikṣumeha*. The stage of impaired glucose tolerance, which shows polyuria, glycosuria and albuminuria are included in *Sāndrameha* and so forth.

Thus, the deficiency of insulin and insulin resistance are the two main causes of *Ikṣumeha* and *Madhumeha*, which is the terminal stage of renal diseases of any cause as well as the deficiency of insulin and insulin resistance.

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