

**STUDY OF MUTRA AND MUTRAVAHA SROTAS IN MADHUMEHA – REASERCH
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ABSTRACT

Ayurveda places great emphasis on prevention and encourages the maintenance of health through close attention to balance in one's life, right thinking, diet, lifestyle. *Dosh, Dhātu, Mala* are fundamental concept of Ayurveda. *Mala* concept is unique in Ayurveda main source of nourishment of our body is food. After digestion it is divided into 'SARA' and 'KITTA'. Sara will get absorbed called as 'AHARRASA' and 'KITTA' will give rise to 'MALA'. After the *Sarakitta vibhajana*, The *Drava* part of *Kitta* converts into *Mootra*. "MOOTRA" is the important excretion from human body. The term 'Madhu' and 'Meha' are indicating the idea of sweet substance similar to honey in respect of taste, odor and color not in concentration, which is secreted profusely through the urinary system. Urine examination is used as one of the important diagnostic and prognostic tool but in Ayurveda urine examination is used in systematic and scientific way for knowing the diagnostic and prognosis of the disease from *samhita kala*. Acharya *Yogratnakar* has described the methods examination of *Mootra pariksha* after the examination of *NadiPariksha* and *Mala pariksha*. Here attempt has been made to elaborate the Ayurvedic *mutra pariksha* collectively in respect to odor, color, quantity etc which can be an important diagnostic and prognostic tool.

INTRODUCTION

Ayurveda is considered by many scholars to be the oldest healing science. In *Sanskrit*, Ayurveda means "The science of life". Knowledge of Ayurveda enables one to understand how to create this balance of body, mind and consciousness according to one's own. When the three basic types of energy that is *Vata, Pitta, Kapha*.^[1] It plays a vital role in balancing the health of human body becomes fit and healthy by proper balance of *Dosha, Dhātu* and *Mala*. *Dosha* are responsible for creating diseases in living body.^[2] *Dhātu* gives support and strength to living body. *Malas* are those constituents of the body which are regularly eliminated from the body and thus keep body clean.^[3] *Purish (stool) Mutra (Urine) and Sweda (Sweat)* are considered as a main excretory product of the body.^[4] After the *Sarakitta vibhajana*, The *Drava* part of *Kitta* converts into *Mutra*. "MUTRA" is the important excretion from human body.^[5] It is the liquid waste product of the body secreted by kidney by the phenomenon of the filtration from blood. The term 'Madhu' and 'Meha' are indicating the idea of sweet substance similar to honey in respect of taste, odor and color not in concentration, which is secreted profusely through the urinary system.^[6] Twenty types of *Prameha* if ignored and not treated properly in time can convert into *Madhumeha*. In pathogenesis of disease *Kapha Dosha* is predominantly aggravated due to increase in *Dravaguna*

of *Kapha Dosha*.^[7] This increase *Kapha dosha* causes *Kledopati* which causes *Agnimandya* and *Dhatvagnimandya*. This increase *Kapha* gets excreted through *Mootravahasrotas* by the sign "Prabhutaavilmootrata."^[8] Diabetes mellitus has gained gigantic disgrace in recent time as it is fast becoming the world's largest silent killer. India has been projected by WHO as the one with the fastest growing population of diabetic patients. It is estimated that between 1995 to 2025 diabetic patients will increase by 195%.^[9] In medical condition in which body cannot produce enough insulin to process the glucose in the blood is known as diabetes.^[10] In modern medicine urine examination is used as one of the important diagnostic and prognostic tool but in Ayurveda urine examination is used in systematic and scientific way for knowing the diagnostic and prognosis of the disease from *samhita kala*.^[11] Ayurvedic *mutra pariksha* collectively in respect to odor, color, quantity etc which can be an important diagnostic and prognostic tool.

AIM AND OBJECTIVE**AIM**

The present study aimed at studying the *Mutra and Mutravaha srotas* in patients suffering from *Madhumeha*. To achieve objectives were, to review the assessment of *Mutra and Mutravaha srotas* w.r.s. to

madhumeha and observe the changes in *Mutra* in *Madhumeha* patient.

MATERIALS AND METHODS

Materials

- Classical sign and symptoms of *Madhumeha*.
- Classical Lakshanas of *Mutra Kshaya – Vriddh Mutravaha sroto dushiti*.
- Investigations according to Ayurvedic and Modern parameters.

Methods

Patients had classical signs and symptoms of *Madhumeha* was selected for the study from O.P.D. and I.P.D. of our Hospital, of age group 30 years to 60 years male, female patients. The known cases of *Madhumeha* male, female patients were subjected for the study.

Sample Size: 60 Patients

Group A: 30 Known cases *Madhumeha* (Diabetes) patients.

Group B: 30 Non-Diabetes individuals.

A] Inclusion criteria

1. Age – Patients between age of 30 – 60 years.
2. Gender – Both male and female Patients will be selected on the basis of classical signs & symptoms of *Madhumeha*.
3. Patients having hyperglycaemia confirmed by laboratory investigation.
4. All Patients of type 2 Diabetes mellitus.

B] Exclusion criteria

1. Age below 30 year & above 60 years.
2. Person suffering from any severe systemic diseases.
3. Chronic complications will be discarded

INVESTIGATION

1) Blood Sugar level

1. Fasting
2. Post prandial.

2) Urine examination

1. Physical examination
2. Chemical Examination
3. Microscopic examination

CRITERIA OF ASSESSMENT

Criteria for Diagnosis of *Madhumeha* by classical sign and symptoms

- *Prabhut mutrata* (Polyuria)
- *Avil mutrata* (Turbidity in urine)
- *Pipasa adhikya* (Polydypsia)
- *Kshuda adhika* (polyphagia/Increase in appetite)
- *Kar pada suptata* (Numbness in palm and foot)
- *Sweda adhikya* (Excessive perspiration)
- *Daurbalya* (Weakness)
- *Alasya* (General debility)

According to sign and symptoms of *Madhumeha* was correlated with DM. So according to modern science

criteria for Diagnosis of *Prameha*, By American Diabetic Association which is accepted by WHO was followed:

- Above Sign and Symptoms of *Madhumeha* .
- Patients having random blood sugar level > 200 mg/dl.
- FBS > 126 mg/dl or
- PPBS > 200 mg/dl

OBJECTIVE PARAMETERS

Examination of following Parameters of urine sample will be carried out

- | | |
|--------------------|--------------------|
| 1. Appearance | 6. PH |
| 2. Colour | 7. Ketone Bodies |
| 3. Odour | 8. Protein albumin |
| 4 Specific gravity | 9. Sugar |
| 5. Volume | |

Examine the normal composition of urine in healthy individual and in DM patient.

1. Urea
2. Uric acid
3. Creatinine
4. Sodium
5. Potassium
6. Chloride
7. Calcium

Ayurvedic *Mutra* Panchabhautik Parikshan

1) Panchabhautikparikshan

1. Sparsha
2. Roopa(Varna)
3. Rasa(By AnumanPraman)
4. Gandha

Mootra Pariksha in Ayurveda

Diagnosis of a disease is based on clinical features, clinical examination and ancillary investigation. For the diagnosis of various as of disease and diseased person, several methods have been described in Ayurvedic texts. These can be broadly classified into *Roga pariksha* and *Rogi pariksha* several methods, like *Astavidha pariksha*, *Dasavidha pariksha* etc.^[12] are meant for diagnosis. Among these *Ashtavidha pariksha* is an important methods of clinical and diagnostic methods which includes *Nadi*, *Mutra*, *Mala*, *Jivha*, *Shabd*, *Sparsha*, *Drik*, *Akruti*.^[13]

Collection of Urine

- Ask the patient to collect the midstream morning sample of urine in dry clean bottle.
- Use sterile container for urine culture.
- Urine analysis should be done when urine sample is fresh.
- After receiving the urine sample, write patients name on the sticker and lable the sample.

Reagent strips

- These strips are made for urine analysis of both quantitative and qualitative, which are Invitro

reagent for diagnostics. It tests Glucose, Protein, Ketone, Ph, and blood in urine.

- The strips are for professional use only.
- The results on the strip can be read visually and instrumentally.
- Immerse the reagent area of the strips in the urine and specimen and take it out immediately after the specified time for each test.
- Run the edge of the strips against the container to remove the excess urine.

Hold the strip up horizontally and compare the result on the strip with the colour chart on the bottle label closely. Make note of the result.

For semi quantitative results, take the result according to the time specified on the colour chart. The pH and protein can be read at any time within 60 seconds after dipping. For a qualitative result, the strip should be read between 1-2 minutes after dipping. If a positive result is obtained, repeat the test and compare with the colour chart at the specified time. Colour changes beyond two minutes are of no diagnostic value.

OBSERVATION AND RESULT

Table. Distribution of patients according to age (years).

Age	Group A		Group B		Total	
	N	%	N	%	N	%
30 – 39	6	20	5	16.7	11	18.3
40 – 49	10	33.3	16	53	26	43.3
50 – 59	14	46.7	9	30	23	38.3
TOTAL	30	100.0	30	100.0	60	100.0

Table: Distribution of Patients According To Gender.

Gender	Group A		Group B		TOTAL	
	N	%	N	%		%
Male	19	63.3	19	63.3	38	63.3
Female	11	36.7	11	36.7	22	36.7
Total	30	100.0	30	100.0	60	100.0

Table. Blood Sugar Level (Bsl) At Fasting And Post Prandial In Two Group Patients.

BSL	Group A		Group B	
	Mean ± SD		Mean ± SD	
Fasting	146.23 ± 28.98		77.1 ± 8.55	
Post prandial	313.17 ± 62.90		122.06 ± 9.96	

Table. Comparison of Panchbhautik Parikshan Symptoms In Two Group Patients.

Symptom		Group A		Group B		Test statistics
		N	%	N	%	
Rupa	Accha	10	33.3	30	100.0	Z=5.47 P<0.01
	Avila	20	66.7	0	0.0	
Rasa	Lavan	14	46.7	30	100.0	Z=4.27 P<0.01
	Madhur	16	53.3	0	0.0	
Gandha	Mutra Gandha	22	73.3	30	100.0	Z=3.03 P<0.01
	Madhu Gandha	8	26.7	0	0.0	
Varna	l.Pita	13	43.3	30	100.0	Chi-square=23.72 DF=2 P<0.01
	Madhu	10	33.3	0	0.0	
	Shukla	7	23.3	0	0.0	

Table. Comparison of Physical Examination of Urine in Two Group Patients.

Physical examination		Group A		Group B		Test statistic
		N	%	N	%	
Appearance	Transparent	18	60.0	30	100.0	Z=3.87 P<0.01
	Claudy	12	40.0	0	0.0	
Color	Pale yellow	10	33.3	6	20.0	Z=1.16 P>0.05
	Colorless	20	66.7	24	80.0	
Odour	Sweetish	17	56.7	0	0.0	Z=4.87 P<0.01
	Aromatic	13	43.3	30	100.0	
Sp.Gravity	1.010-1.025	23	76.7	30	100.0	Z=2.81 P<0.01
	>1.025	7	23.3	0	0.0	
Volume	6-7 times/day	3	10.0	26	86.7	Chi square=35.61 DF=2 P<0.01
	8-14 times/day	23	76.7	4	13.3	
	8-14 times/day	23	76.7	4	13.3	
	>14 times/day	4	13.3	0	0.0	
PH	4-5	7	23.3	0	0.0	Chi square=12.44 DF=1 P<0.01
	6-7	22	73.3	22	73.3	
	>7	1	3.3	8	26.7	

Table. Comparison of Chemical Examination of Urine in Two Group Patients.

Chemical examination		Group A		Group B		Test statistic
		N	%	N	%	
Keton B	Yes	3	10.0	0	0.0	Z=1.77
	No	27	90.0	30	100.0	P<0.05
Sugar	Yes	21	70.0	0	0.0	Z=5.68
	No	9	30.0	30	100.0	P<0.01
Albumine	Yes	2	6.7	0	0.0	Z=1.43
	No	28	93.3	30	100.0	P>0.05

Table: Comparison of Microscopic Examination of Urine In Two Group Patients.

Microscopic examination	GROUP A		GROUP B	
	N	%	N	%
RBC	0	0	0	0
Pus cell	0	0	1	3.33%
Epithelial cell	0	0	1	3.33%
Cast	0	0	0	0
Crystal	0	0	0	0

Table. Comparison of Urine Composition in Two Group Patients.

Chemical Examination	Group A	Group B	Test statistic
	Mean ± SD	Mean ± SD	
Uric acid	387.38 ± 308.34	190.54 ± 88.27	t=3.30,P<0.01
Cretenine	180.27 ± 108.71	144.53 ± 65.71	t=1.51,P>0.05
Calcium	164.13 ± 140.73	114.27 ± 77.70	t=1.67,P<0.05
Urea	232.1 ± 63.44	196.83 ± 54.52	t=2.27,P<0.05
Sodium	151.87 ± 64.04	111.00 ± 50.62	t=2.69,P<0.05
Potassium	52.73 ± 21.44	58.60 ± 11.56	t=1.29,P>0.05
SChloride	180.83 ± 48.13	159.93 ± 34.50	t=1.90,P<0.05

Table: Comparison of *Mutravaha Sroto Dushti* Symptoms In Two Group Patients.

Symptoms	Group A		Group B		Test statistic
	N	%	N	%	
Atisrushta Mutra Pravrutti	15.0	50	5	16.7	Z=2.73 P<0.01
Atibadda Mutra Pravrutti	3.0	10	0	0.0	Z=1.77 P<0.05
Alpa Mutra Pravrutti	3.0	10	0	0.0	Z=1.77 P<0.05
Sashula Mutra Pravrutti	0.0	0	3	10.0	Z=1.77 P<0.05
Bahal Mutra Pravrutti	18.0	60	2	6.7	Z=4.38 P<0.01

Table: Comparison of *MutraKshaya* symptoms in two group patients.

Symptoms	Group A		Group B		Test statistic
	N	%	N	%	
MutraKrichna	1.0	3.3	0	0.0	Z=0.59 P>0.05
MutraVaivarnya	16.0	53.3	2	6.7	Z=3.94 P<0.01
Pipasa	16.0	53.3	4	13.3	Z=3.28 P<0.01
Mukhashushkata	6.0	20.0	2	6.7	Z=1.51 P>0.05
SaastraMutraPravrutti	0.0	0.0	0	0.0	--

Table: Comparison of Mutravruddhi Symptoms In Two Group Patients.

Symptoms	Group A		Group B		Test statistic
	N	%	N	%	
Bastitode	3.0	10.0	0	0.0	Z=1.77 P<0.05
Kruteapakrutasadhnata	8.0	26.7	2	6.7	Z=2.07 P<0.05
Muhurmuhu Mutrapravrutti	7.0	23.3	0	0.0	Z=2.81 P<0.01
Adhmana	0.0	0.0	0	0.0	--

DISCUSSION

- Age** - In present study maximum i.e. 43.33 % of patients were from age group 40-49. While 38.33 % patients were from age group 50-59 and 18.33 % patients were from age group 30-39. It may indicate that incidence of Type 2 D.M. is more in middle and old age.
- Sex** - In present study maximum i.e. 63.33 % of patients were Male. While 36.7% patients were female.
- Religion** - In our study 65% of the patients were Hindu and 25% were Muslims and 10% were Buddha Religion. It may be due to demographic factor.
- Occupation** - The present study shows that maximum number of patients i.e.23 (38.66%) having Private service as occupation while 17 (38.3%) are house wife, 10 (16.7%) doing Government service and 10(16.7%) are farmer.
- Diet consumption** - In the present study, maximum patients 61.7 % were consuming mixed diet and 38.3% consuming vegetarian diet.

Discussion on Parameters of Panchabhautik Examination of Mutra

Varna (Color)-Tejo Mahabhot is the responsible factor for production of all color. This Tejo Dhatu in living body is present in the form of Pitta. So any 'Tejodhatu Sarva Varnaanam Prabha'' are having important role in offering color to urine. Prakrut mutra is Ishat pita varna. In Madhumeha urine is like honey – glycosuria Madhuvarna, Shuklameha- whitish urine, Haridrameha-bilurialac, Kalameha – black melanuria, Neelmeha-bluish indicuria.

Varna – In group A patients having diabetes were 43.3% have Ishat pitavarna, 33.3% have Madhu varna and 23.3% have Shukla varna urine. In group B patients were 100% Ishat pita varna.

Rupa (Transparency) – Achha denotes clear urine, Anachha sample having traces of haziness, Avila sample denotes markedly turbid urine.

RUPA – In group A patients having Diabetes were 67.7% have Avil MootraPravrutti and 33.3% have Accha Mootra Pravrutti. In group B patients without diabetes were 100% have Accha mootra pravrutti.

Rasa (Taste) – Taste can not be directly examined. By observing flies on patients body physician should assume

Madhura Rasa of the body or interrogation. In Prakruta rasa of the urine is lavan or katu rasa. In Vikruta that is in Madhumeha specimen of urine or urine passed area is get attracted by ants, flies suggest that urine is having Madhura Rasa.

Rasa – In group A patients were 53.3% have madhura rasa urine and 46.7% have lavan rasa urine. In group B patients were 100% lavan that in normal rasa of urine.

Gandha (odour) – Normal smell of urine is 'mutra gandha'' means having irritant smell that is aromatic or ammonium smell. In madhumeha urine having madhugandha that is honey like smell.

Gandha –In group A patients were 73.3% have mutragandha urine and 26.7% have madhugandh urine. In group B patients were 100% patients have mutraganda urine.

Discussion on Mutravaha sroto dushti lakshana

In group A patients were 60% have Bahalmutrapravrutti and 50% patients have Atisrushtamutra pravrutti, 10% have atibadhamutra and alpamutrapravrutti, 0% sashulamutra pravrutti. In group B patients were 16.7% have atisrushta mutrapravrutti, 10% patients have sashulamutrapravrutti and 6.7% have bahalmutrapravrutti, 0% have atibadhamutra pravrutti and alpamutrapravrutti.

Bahala mutra pravrutti is the symptoms which can be correlated with the prabhut mutra pravrutti (polyuria). Kapha undergoing increase by the etiological factors, reaches various dushyas like rasa, rakta etc. as there is a shaithilyata in the body abd it being fluid predominant, spreads all over the body and vitiated, while spreading it gets mixed with medas, mamsa and kleda and this excess body fluids excreted by urinary bladder produces symptoms bahalmutra pravrutti.

Discussion on Mutra kshaya lakshana

In group A patients were 53.3% have mutravaivarnya and 53.3% patients have pipasa, 20% have mukhashushkata and 3% have mutrakruchhata, 0% saastramutra pravrutti. In group B patients were 13.3% have pipasa, 6.7% patients have mutravaivarnya and mukhashushkata, 0% have mutrakrichha and saastramutra pravrutti.

Mutra vaivarnya is the symptoms which can be correlated with the avila mutrata (turbid urine). In

madhumeha the abnormal metabolic admixture of *dushtadhatus*, *pradushtadhatus* with *mutra* which makes *mutra pradushtita* or *sam mutra*. There fore is extra addition of *Ama* and its constituents to *mutra* which make *mutra* turn *avila*.

Discussion on *Mutra vrudhi lakshana*

In group A patients were 26.7% have *kruteapiakruta sadhnata* and 23.3% patients have *muhurmuhu mutra pravrutti*, 10% have *bastitode*, 0% *adhmana*. In group B patients were 6.7% have *kruteapiakrutasadhnata*, 0% patients have *bastitode*, *muhurmuhu mutra pravrutti*, *adhmana*.

Discussion on physical examination of urine

On Comparison of Physical examination of urine in two group patients, 'z' test is applied, As $p < 0.01$ so, p is highly significant, it suggest that there is highly significant difference observed between two groups level of appearance, Odour, Sp.Gravity, Volume and PH.

Thus above statistics shows that there is significant vitiation in *Mutra*.

Discussion on Chemical examination of urine

On Comparison of Chemical examination of urine in two group patients, 'z' test is applied, as $p < 0.05$ so, p is significant, it suggest that there is significant difference observed between two groups level of Keton B and Sugar ($P < 0.05$).

Thus above statistics shows that there is significant vitiation in *Mutra*.

Discussion on Microscopic examination of urine

In the present study, in Non-Diabetes Group only 3.33% individual shows the presence of pus cell and epithelial cell.

Discussion on composition of urine

On Comparison of Urine composition in two group patients, un-paired 't' test is applied, as $p < 0.05$ so, p is significant, it suggest that there is significant difference observed in urine composition of Uric acid, Calcium, Urea, Sodium and Chloride between two groups. Thus above statistics shows that there is significant vitiation in composition of *Mutra*.

Relation between *Madhumeha* and *Mutra*, *Mutravaha srotas*

Diabetes mellitus is becoming fastest considerable diseases in the world. It is a Metabolic disorder may result in deficiency or dysfunction of the insulin production. In Ayurveda it is described in *Vataja Prameha*.

In Ayurvedic texts various *Dosha*, *Dushyas* described in *Prameha* are *Vata*, *Pitta*, *Kapha*, *Rasa*, *Rakta*, *Mamsa*, *Meda*, *Majja*, *Shukra*, *Sharir kleda*, *Vasa*, *Lasika* and *Oja*. There is *srotas* involved is *Mootravaha Srotas* having the *sroto Dushti* that is *Atipravrutti* and *Vimargagan* and the *Vyaktsthana* of this disease is

mainly *Mootra* and *Mootravaha srotas*. *Prameha* are a list of urinary disorder, especially characterized by profuse urination with several abnormal qualities due to *Doshik* imbalances. The main cause of *Prameha* are exercise and improper foods habits in excess food intake which falls in the category of *Ushna*, *Snigdha* and *Guru* are the primal cause of this disease. Foods that increase *kapha*, *Meda* and *Mootra* are the etiological factors of *Prameha*. The word *prameha* is derived from, *Pr*- means excess, *Meha*- means, *ksharane*- passing of urine. So *Prameha* is passing excessive urine and turbid in color.

Madhumeha is one of the variety included under *Vataja Prameha* and it is mentioned that if *Prameha* not cured or treated in due course of time it gets converted in to *Madhumeha*.

In pathogenesis of disease, the condition caused by impairment of *Kaphadosha* and *Jala Mahabhuta* i.e. disturbed metabolism of water compartments in the body giving laxity in body tissue especially in fat, muscle tissues giving them *Abaddha* and *Asamhat* constancy. *Kapha dosha* vitiation mainly hampers fat or lipid metabolism leading to formation of *Kleda*, excessive evacuation of this *kleda* in form of profuse, claudy urine "*Prabhuta Avila Mutrata*" is cardinal symptoms described. This excess *kleda* brings *shaithilyain* surroundings tissues like Muscle, Lymph, Marrow, Semen, Fat and advance stage putrefy them. Therefore these tissue are considered as *dushya* or target of *Madhumeha*. Formation *kleda*, disturbed lipid metabolism are key points in pathophysiology of *Madhumeha*. Sweet urine is also a main symptom in *Madhumeha*. *Ojas* has been mentioned as one of the pathogenic material (*dushya*) in *prameha* generally and specially in *Madhumeha*. In *Madhumehaurine* is extremely sweet without any trace of astringency because of profuse excretion, loss of *ojas*. That all the body fluids which got vitiated draw them to the urinary bladder and produced *Madhumeha*.

CONCLUSIONS

- Mostly Diabetes affects the middle aged people living a sedentary life and Positive family history plays a major role in its development. Patients having Diabetes history for minimum 5 years shows maximum symptoms of *Mootra* and *Mootravaha Srotas Dushti* than Non diabetes individuals. That is *Bahalmootra Pravrutti* i.e. polyuria and *Mootra Vaivarnya* i.e. claudy urination.
- There is significant difference in *Mootra Panchabhautik* Examination. Maximum patient have *Avila Mootra Pravrutti*, *Madhura rasa* urine, *Mootragandha* and *Madhu Varna* urine.
- As the difference regarding the physical and chemical examination of urine there is significant difference in Appearance and Color of urine. Sp. Gravity, Volume, ph is increased and sugar is present in Diabetic Patients than Non-Diabetic

individuals. In Urine composition there is increased level of Uric acid and Sodium, decreased Calcium level in Diabetic group. There is no difference in Microscopic examination in both Diabetic and Non-diabetic groups .

- Our study indicated that there is vitiation in *Mootra* and *Mootravaha Srotas* both qualitatively as well as quantitatively in *Madhumeha*.

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