Multi Modal Ayurvedic Treatment of Madhumeha (with Particular Reference to Type 2 Diabetes Mellitus)

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ABSTRACT
INTRODUCTION
Madhumeha is a vata dominant prameha which comes into yapya category of asadhya diseases having madhusamam mutrapravritti and prabhuta-avilamutratra as cardinal features. Type 2 diabetes mellitus of modern medical science resembles avaranajanya madhumeha mentioned in classics.

MATERIALS AND METHODS
Total 31 patients of madhumeha were treated with multimodal therapy for 6 weeks. Following sarvanga abhyanga with tilataila and sarvanga bashpasvedana with plain steam for 3 days in early morning, mriduviirechana was given on 3rd day with erandasneha 30-40 ml and dinadayalachurna three to five grams (according to koshtha) which was followed by samsarjanakrama on 4th day. Niruhabasti with pathyadi kvatha was given for 8 days starting from the 5th day. Jambubija ghanavati was started as oral medicament from 5th day in dose of 4 tablets (500 mg each) twice a day before meals which was given for total 38 days. The results were then assessed by relief in subjective and objective criteria by a specially prepared grade score and laboratory investigations.
RESULTS:
Significant improvement with p value less than 0.001 was observed in all of the subjective and objective criteria.

CONCLUSION:
Madhumeha is yapya disease which can be managed by this multimodal therapy showing significant improvement in all of the subjective and objective criteria.

KEYWORDS
Madhumeha, Type 2 Diabetes Mellitus, Multimodal Therapy
INTRODUCTION

Madhumeha is a vata dominant prameha which comes into yapya category of asadhya diseases. Madhusamam mutrapravritti is a cardinal feature of madhumeha. Cardinal features of prameha which are prabhuta and avilamutrata, can also be considered as features of madhumeha. In modern medical science, diabetes mellitus which literally means frequent and sweet urination can be considered as a similar clinical condition for madhumeha. Amongst its two main types, type 2 diabetes mellitus resembles avaranajanya madhumeha mentioned in classics. In this type, despite presence of insulin (the vata principle), because of its resistance (avarana), there is impaired cellular uptake as well as metabolism of glucose and thus hyperglycemia (madhurya) occurs in body. Diabetes is a global pandemic. The number of people with diabetes has risen from 108 million in 1980 to 422 million in 2014 all over the world. WHO projects that diabetes will be the 7th leading cause of death by 2030. The International Diabetes Federation (IDF) estimates the total number of diabetic subjects to be around 40.9 million in India and this is further set to rise to 69.9 million by the year 2025.

AIMS AND OBJECTIVES

1. To study and observe the effectiveness of multi modal treatment in the management of madhumeha (type 2 diabetes mellitus).
2. To establish the effectiveness of multi modal treatment in the management of madhumeha, logically.

MATERIALS AND METHODS

Patients of both genders, between the ages of 25 to 65 years, with fasting venous glucose from 127 to 170 mg/dl or postprandial venous glucose from 200 to 300 mg/dl who were compatible for the therapy were registered in the clinical trial from outdoor and indoor patients department of P. D. Patel Ayurved Hospital, Nadiad. The study obtained Institutional Ethics Committee clearance (JSAM/IECHR/30/05-2015) and was registered at Clinical Trial Registry of India (CTRI/2015/11/006362). A written informed consent from each patient was taken before enrolling in the clinical trial.

Exclusion criteria:
1. Patients with associated diseases like cancer, tuberculosis, severe cardiovascular disease.
3. Patients having diabetes mellitus in association with other endocrinopathies like phaeochromocytoma, acromegaly, Cushing’s syndrome and hypothyroidism.
4. Patients having drug or chemical induced type 2 diabetes mellitus, like glucocorticoids induced or thyroid hormone induced.
5. Patients with genetic syndromes associated with type 2 diabetes mellitus like Down’s syndrome, Klinefelter’s syndrome, Turner’s syndrome.
6. Patients who were dependent on insulin.
7. Patients who were not suitable for virechana and basti.
8. Pregnant and lactating women.

Criteria of withdrawal:
Any participant suffering clinical conditions i.e. hyper-osmolar state, hypoglycemia, ketoacidosis, systemic infections was to be withdrawn from the study.

Investigations:
1. Fasting venous glucose
2. Postprandial venous glucose
3. Urine sugar (fasting and postprandial)

Treatment protocol:

Mridu virechana karma:

→ Purva karma:
1. Sarvanga abhyanga with tilatala.
2. Sarvanga bashpasvedana with plain steam.

Duration: 3 days once in the morning

→ Pradhana karma:
Erandasneha 30-40 ml and dinadayala churna (anubhuta virechanayoga) were prepared in Sundar Ayurveda Teaching Pharmacy by combination of churnas of the following drugs: haritaki, yavani, saindhava and svarnapatri. Three to five grams (according to koshita) with lukewarm water was given on 3rd day early in the morning after sarvanga snehana and svedana.

→ Pashchat karma:
Samsarjana krama with some modifications from the classics, for 3 annakala. Mudgayusaha was given as dinner on the virechana day. The next day, boiled mung and boiled vegetables were given both the times.

Niruh basti karma:
Niruh basti with pathyadikvatha was given every day after performing the sarvanga abhyanga with tilatala and sarvanga bashpasvedana with plain steam for next 8 days.

Criteria of withdrawal:
Any participant suffering clinical conditions i.e. hyper-osmolar state, hypoglycemia, ketoacidosis, systemic infections was to be withdrawn from the study.

Investigations:
1. Fasting venous glucose
2. Postprandial venous glucose
3. Urine sugar (fasting and postprandial)
Niruhabasti was made according to the classics with following contents:

Madhu30 ml, saindhava5 gm, tilataila as sneha30 ml, basti kalka7 (yavani, bilvagarbha, madanaphala, kushtha, vacha, shatapushpa in equal parts each) 15 gm, pathyadi kvatha8,9 240 ml.

Shamanachikitsa:

Jambubija ghanavati:

Content: Seeds of Syzygium cumini (Linn.) Skeels

Dose: 4 tablets (500mg each) twice a day before meals.

Duration: It was started from the 5th day of the treatment and continued for next 38 days.

Total duration of the treatment was of 6 weeks.

Diet:
Patients were kept on following diet during multi modal therapy:

Breakfast: 10 grams chyavanaprashavaleha with 100 ml milk

Lunch and dinner: Boiled mung, barely flour chapatti, mung beans soup and boiled vegetables (except potatoes).

Rice, sweets, sour food items, items which are heavy to digest were strictly prohibited during the therapy.

Conventional medicines during therapy:

All the patients who were consuming the conventional anti hyperglycemic drugs were instructed to stop them from the day of virechana and also not to start it again prior to the instructions by investigator. Blood sugar level was checked time to time and if required, the same anti-hyperglycemic agents were started with smaller dose. Changes in the dose of drugs were noticed and are mentioned in the results.

Criteria for assessment:

Assessment was done on the basis of signs like Fasting blood sugar, Postprandial blood sugar, Fasting urine sugar, Postprandial urine sugar, prabhubhumrutata (assessed by total urine output and frequency of urine in 24 hours) and grade score pattern prepared for the symptoms likekshudhadhiyaa, trishnadhikya, gala-talushosha, kara-padataladaha, kara-padatalasupatat, pindikodveshtana, daurbalyaandatisveda.

The grade score pattern is shown in Table 1

Criteria for the assessment of overall effect of therapy:

1. Improvement < 25% – no relief
2. Improvement >= 25% up to 50%-mild relief
3. Improvement >= 50% up to 75%-moderate relief
4. Improvement >= 75% up to 100%-marked relief
5. 100% improvement- complete relief of subjective and objective criteria each, the For the overall assessment, the subjective criteria and objective criteria were given equal (i.e., 50%) weightage. For assessment were considered.

**Table 1** Grade score pattern showing criteria for assessment

<table>
<thead>
<tr>
<th>Grades</th>
<th>Prabhuta mutrata</th>
<th>Avilamrutrata</th>
<th>Kshudadhikya</th>
<th>Trishna-dhikya</th>
<th>Gala-talushosha</th>
<th>Kara-padatala daha</th>
<th>Kara-padatalasuptata</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No shosha</td>
<td>No daha</td>
<td>No suptata</td>
</tr>
<tr>
<td>1</td>
<td>a) Total urine output (in ml) Up to 1500</td>
<td>b) Frequency of urine in 24 hours</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1500-2000</td>
<td>Slight cloudy or smoky</td>
<td>Turbidity clearly present</td>
<td>Increased (Main meals-2 Snacks-2-3)</td>
<td>Feeling of thirst off and on can be managed by a glass of water</td>
<td>Mild to moderate burning occasional</td>
<td>Mild to moderate occasional suptata</td>
</tr>
<tr>
<td>2</td>
<td>2000-3000</td>
<td>Turbidity clearly present</td>
<td>Increased (Main meals-2 Snacks-3-5)</td>
<td>Increased with increased frequency of drinking water (2.5-3 liters water intake/24 hours)</td>
<td>Feeling of thirst is severe but can be managed by drinking sufficient amount of water</td>
<td>Moderate to severe for very often and regular activity not hampered</td>
<td>Moderate to severe for very often and regular activity not hampered</td>
</tr>
<tr>
<td>3</td>
<td>&gt;3000</td>
<td>Extremely turbid</td>
<td>Increased (Main meals-3 Snacks-2-3)</td>
<td>Very much increased (&gt;3 liters water intake/24 hours)</td>
<td>Severe feeling of thirst remains even after drinking water</td>
<td>Very severe for whole day and regular activity hampered</td>
<td>Very severe for whole day and regular activity hampered</td>
</tr>
</tbody>
</table>
8 **Pindikodveshtana**

| No cramps | Cramps after walking 1 km or heavy work | Cramps after walking 1/2-1/4 km or moderate work | Cramps during routine active work |

9 **Daurbalya**

| Can do routine work / exercise | Can do moderate exercise with hesitancy | Can do mild exercise only, with difficulty | Can’t do mild exercise too |

10 **Atisveda**

| Sweating after heavy work and fast movement or in hot weather | Profused sweating after moderate work and movement | Sweating after little work and movement | Profuse sweating after little work and movement |

**Statistical analysis:** Obtained data were statistically analysed using student paired t-test.

**RESULTS AND DISCUSSION** Statistically highly significant results were observed in all of the signs and symptoms. As seen in Table 2, among the

**Table 2** Effect of multimodal treatment on objective criteria of 31 patients of *madhumeha* (type 2 diabetes mellitus)

<table>
<thead>
<tr>
<th>Mean score</th>
<th>% Relief</th>
<th>Paired ‘t’ test</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Mean score</th>
<th>% Relief</th>
<th>Paired ‘t’ test</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Prabhutamutrata:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total urine output (24 hours)</td>
<td>1.46</td>
<td>0.85</td>
</tr>
<tr>
<td>Frequency of urine in 24 hours</td>
<td>9.70</td>
<td>7.22</td>
</tr>
<tr>
<td><strong>FBS</strong></td>
<td>150.80</td>
<td>118.61</td>
</tr>
<tr>
<td><strong>PPBS</strong></td>
<td>255.61</td>
<td>175.96</td>
</tr>
<tr>
<td><strong>FUS</strong></td>
<td>1.77</td>
<td>1.00</td>
</tr>
<tr>
<td><strong>PPUS</strong></td>
<td>2.51</td>
<td>1.22</td>
</tr>
</tbody>
</table>
objective criteria, maximum i.e. 51.28% relief was observed in post-prandial urine sugar (PPUS), followed by 43.63% relief in fasting urine sugar (FUS) and 41.46% relief in total urine output in 24 hours which was one of the parameters for assessing prabhuamrutara. Another parameter for assessing prabhuamrutara was frequency of urine in 24 hours, in which 25.58% relief was found. In fasting blood sugar (FBS) and post-prandial blood sugar (PPBS), 21.34% and 31.15% relief were found, respectively.

As seen in Table 3, among the subjective criteria, maximum i.e. 80.00% relief was observed in karapadataladaha, followed by 76.92% relief in karapadatalasuptata and 72.22% in pindikodveshtana. 59.64% and 58.18% relief were found in gala-talushasha and trishnadhikya respectively. In atisveda, kshudhadhikya and daurbalya; 55.00%, 51.28% and 50.94% relief was found.

For all of the subjective and objective criteria, p value was less than 0.001 which suggests that results obtained here are not by chance.

**Overall assessment of effect of multimodal treatment on 31 patients of madhumeha (type 2 diabetes mellitus):**

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Mean score</th>
<th>% Relief</th>
<th>Paired ‘t’ test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>BT</td>
<td>AT</td>
<td>D (BT-AT)</td>
</tr>
<tr>
<td>Karapadataladaha</td>
<td>1.66</td>
<td>0.33</td>
<td>1.33</td>
</tr>
<tr>
<td>Karapadatalasuptata</td>
<td>1.62</td>
<td>0.37</td>
<td>1.25</td>
</tr>
<tr>
<td>Kshudhadhikya</td>
<td>1.85</td>
<td>0.90</td>
<td>0.95</td>
</tr>
<tr>
<td>Trishnadhikya</td>
<td>1.96</td>
<td>0.82</td>
<td>1.14</td>
</tr>
<tr>
<td>Gala-talushasha</td>
<td>2.03</td>
<td>0.82</td>
<td>1.21</td>
</tr>
<tr>
<td>Pindikodveshtana</td>
<td>1.63</td>
<td>0.45</td>
<td>1.18</td>
</tr>
<tr>
<td>Daurbalya</td>
<td>1.96</td>
<td>0.96</td>
<td>1.00</td>
</tr>
<tr>
<td>Atisveda</td>
<td>1.81</td>
<td>0.81</td>
<td>1.00</td>
</tr>
</tbody>
</table>

Out of total 31 patients, 45.16% patients belonged to the group of moderate improvement, 38.71% patients belonged to the group of mild improvement, the overall results of 9.68% patients remained unchanged while 6.45% patients belonged to the group of marked improvement.

Among total 31 patients, 23 patients were taking conventional treatment before starting multimodal therapy even though their blood and urine sugar level was high. Among
them, 9 patients (39.13%) were reported to maintain normoglycaemia without conventional treatment and so they were instructed to discontinue it. We were able to maintain blood sugar level of 6 patients (26.08%) with half dose of their conventional medicaments. However, 8 patients (34.78%) needed their conventional medicaments to maintain normoglycaemia and so they were instructed to continue it along with this therapy.

Discussion on the disease reveals that madhumeha (type 2 diabetes mellitus) is kapha-vata dominant disorder in which vata gets avrita by kapha. Rasa, udaka, mamsa and medas are mainly involved in the pathogenesis of madhumeha. 85.29% patients had kulavritta of madhumehawhich shows a strong genetic component. Majority of the patients did kaphaprakopakaaharasevana (madhura, amla, guru and snigdha) and viharasevana (sanshodhanabhavaand avayama).

Virechana and bastikarma were done for pacifying both vata and kaphadosha and to remove avarana of kaphadosha. Pathyadikvatha used in niruhabasti has mainly kaphashamaka properties. Jambubija ghanavati having kashaya rasa; laghu, rukshaguna; katuvipaka; dipana and mutrasangrahaniya karma; works on provoked kapha and by removing avarana of kapha, helps vata in its normal functions.

CONCLUSION

Madhumeha is yapya disease which can be managed by this multi modal therapy. The multi modal therapy is effective in reducing the subjective parameters and controlling blood and urine sugar level in the patients of madhumeha (type 2 diabetes mellitus) and it was statistically significant (P<0.001). No any unwanted effect noticed during the entire study period.
REFERENCES