Case Report

Efficacy of Integrated Ayurveda treatment protocol in type 2 diabetes mellitus – A case report

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ABSTRACT

Type 2 Diabetes Mellitus (T2DM) is a growing global concern having reached the epidemic proportion in most countries. Achieving glycaemic control decreases the risk of macrovascular and microvascular complications in T2D. To achieve and maintain good glycaemic control, lifestyle changes and pharmacological treatment is necessary. Pharmacological management of T2DM have some limitations as it may lead to vit-B12 deprivation, hypoglycemia, increased cardiovascular risk etc. Treatment algorithm that include integration of Ayurvedic treatment & diet, Panchakarma therapies and Yoga will ensure good glycaemic control and reduce the progression of complications. Diagnosed cases of T2DM without intervention of conventional pharmacological drugs will be safe and beneficial. A female patient aged about 52 years visited to diabetic specialty OPD with the following complaints: increased micturation frequency, vaginal itching, fatigue and increased thirst. Patient reported weight gain in past 1 year, was not on any conventional antidiabetic medication. Her HbA1c status confirmed diagnosis of T2DM. Patient was treated with a course of nitya virechana (medicated purgation) and Sarwanga Udwartana (Dry medicated powder rubbing whole body) for the duration of 7 days along with ayurvedic medicines for 1 year. Patient was prescribed Ayurvedic diet and Yoga practices throughout the intervention. This case report reveals the protocol based integrated Ayurveda and Yoga practices for diagnosed case of T2DM without causing any untoward effect along with reversal of the diabetes.

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1. Introduction

Type 2 Diabetes Mellitus (T2DM) is the most common form of DM characterized by hyperglycaemia, insulin resistance and relative insulin deficiency [1]. According to the International Diabetes Federation (IDF), approximately 415 million adults between the ages of 20–79 years had diabetes mellitus in 2015. T2DM is proving to be a global public health burden as this number is expected to rise to 615 million by 2040 [2]. It is estimated that by 2030 this would have risen to 552 million [3]. Ayurveda describes a set of complex clinical disorders with frequent abnormal micturition, collectively called Prameha (Diabetes Mellitus), which correlate in many ways with obesity, metabolic syndrome, and diabetes mellitus [4]. Type 2 DM is analogous to Shula pramehi (Obese Diabetic) which is also known as Apathyanimitta Prameha or acquired type of diabetes resulting due to faulty lifestyle [5]. Samshodhana (purification) is the best treatment for the elimination of Doshas. Vagbhata has mentioned that Doshas should be eliminated through the nearest pathway [6]. Ayurvedic medications with lifestyle modifications contribute to desired clinical outcome as proper diet and management of daily routines will remove the causative factors of disease and helps in preventing progression of the disease. Yoga has been practiced since ancient times to manage the physiology of the body. This not only improves the flexibility but also improves the function of both endocrines and exocrine glands of the body. Various studies have reported that Yoga has a positive impact in the management of Type 2 diabetes. Different Asanas such as Surya Namaskara helps in insulin production and improvement of digestive fire [7].

Present case report deals with the Ayurvedic approach of Panchakarma, Ayurvedic medications, Yoga, Pathyahara and lifestyle.
counseling. All of these helped to achieve desired clinical outcome without causing any side effects and there was no recurrence of symptoms in the follow up period of about one year.

2. Patient information

A female patient aged about 52 years, who was homemaker visited to diabetic specialty OPD on 14/01/2018 with the following complaints: increased frequency of micturition for 1 month (5–6 times during day and 1–2 times at night), fatigue since 1-year, increased thirst from 2 months which was progressive in nature and vaginal itching from 15 days. Patient had noticed weight gain (approx 10 kg’s) in a period 12 months. Patient had hypertension for 8 years and was on antihypertensive medications. Patient had weight gain increased thirst from 2 months which was progressive in nature and the BMI of the patient are 38 inches and 35.5 Kg/m² respectively. Assessment on 14/01/2018 revealed FBS-174 mg/dl, PPBS-208 mg/dl, and HbA1c-8.8. As a result of these variables confirmed the diagnosis of T2DM. Patient was found to be dull in action, lethargic with disturbed sleep and moderate appetite,Krura koshta (bawl hard to purgate) with increased micturition. Patient had Pitta Kapha Prakriti (body constitution) which was assessed using ‘CCRAS Prakriti assessment scale’ available on [http://www.ccras.res.in/ccras_pas/](http://www.ccras.res.in/ccras_pas/).

3. Clinical findings

Patient had frequent micturition, associated with fatigue, thirst and vaginal itching. Patient also had progressive weight gain. Personal details and habits of the patient include lifestyle with a lot of sitting and lying down, with minimal physical activity and sedentary lifestyle. On examination, patient had abdominal obesity and well-nourished body. She had normal menstrual and obstetric history include Gravida 2, live births 2 and no abortion history (G2L2A2). The patient was 152 cm tall and weighed 82 kg and waist circumference and BMI of the patient are 38 inches and 35.5 Kg/m² respectively. Assessment on 14/01/2018 revealed FBS-174 mg/dl, PPBS-208 mg/dl, and HbA1c-8.8. Together these variables confirmed the diagnosis of T2DM. Patient was found to be dull in action, lethargic with disturbed sleep and moderate appetite, Krura koshta (bowl hard to purgate) with increased micturition. Patient had Pitta Kapha Prakriti (body constitution) which was assessed using ‘CCRAS Prakriti assessment scale’ available on [http://www.ccras.res.in/ccras_pas/](http://www.ccras.res.in/ccras_pas/).

4. Diagnostic focus and assessment

Diagnosis was based on clinical symptoms and biochemical parameters. Patient complained of experiencing increased frequency of micturition, thirst, fatigue, marked obesity and was diagnosed with Prameha [8,9]. Based on history and examination, patient presented with typical features of Madhumeha a type of Vataja prameha. We found Pitta and Kapha in association with it. While analysing the symptoms, thirst indicated Pitta dominant Madhumeha (8. Chi 28/61) whereas marked obesity, fatigue, lethargy indicated Kapha dominant Madhumeha (8. Su.20/17) (8. Chi 28/62). Hence diagnosis can be made as Kapha-pitta vratara Madhumeha (Kapha-Pitta dominating Madhumeha), In Type 2 DM, presence of hyperglycaemia for months or years eventually causes the extreme thirst, frequent urination, tiredness, nausea and dizziness [10]. Since symptoms were present for more than a month, patient was obese and had absence of autoimmune diseases history [11] along with lab investigations of following variables: fasting blood sugar, post prandial blood sugar and Glycosylated haemoglobin, all confirmed diagnosis of T2 DM.

5. Therapeutic intervention

Kapha dosha (along with other 2 doshas) and Medo dhatu will dominate in Madhumeha [12]. Shodhana (detoxification therapy) is the first line of treatment indicated in classics. For Kapha and Meda vitiation, external treatment modalities such as Abhyanga (oil massage), Udwaratana (dry powder rubbing) etc. are indicated. In this case, patient underwent for a course of Nitya Virechana (daily purification therapy) with Triphala churna 10 gms every night for duration of 7 days. Sarvanga Udwratana with T. churna (QS) was performed for the duration of 7 days. After 7 days of above treatment, internal medication were prescribed which included Nishakatakadi Kashaya (contains ingredients such as Nisha, kaktha, amalaka, Paranti, lodhra, badhrika, Peetika, usira) 15 ml tid, Amalakyadi compound (Amalaki + Godshura + Sariva + Guduchi + Chopachini + Haridra + Daruharida + Yashtimadhu churna – each 10 gms + Vanga bhasma (2.5 gms) 1tsf BD with warm following food consumption were prescribed for a duration of 1 year (Table 2).

Ayurveda diet explained in Madhumeha was planned. Diet was customized as per patients traditional food intake, regional availability etc. (Table 3).

Yoga protocol included wide range of components which could be done in short duration starting from breathing practices to meditation. Patient underwent stretch breathing and loosening practices for five minutes each before advancing to suryanamaskar (5 minutes) and varieties of asanas. Ardakati chakrasana, parivratta trikonasana, vakrasana, arda matsyendriyasana, bhujangasana, dhanurasana, pawanamuktasana and matsyasana are the asanas advised for 10 minutes each. Kapala bhati was practiced regularly which was then followed by pranayama like nadi shuddhi, bhramari and om chanting for 10 minutes and cyclic meditation at the end. Relaxation technique was also part of protocol after vigorous asanas and kriya.

No any adverse events occurred during the course of treatment.

6. Follow up and outcome

Biochemical parameters were assessed at each follow up and improvement was observed in each parameter. Follow up treatment and improvement in lab parameters are summarised in Table 4. Increased micturition frequency, thirst, fatigue, vaginal
itching were reduced. Her energy level was improved and healthy weight loss of about 1–2 kg per month was observed (Approximately 10 kgs in a period of 1 year).

7. Discussion

Patient treated with traditional approach i.e Panchakarma procedures, oral medicines, Ayurvedic Pathyahara and Yoga intervention.

Samshodhana (purification) and Avaranahara (removal of body channels’ occlusion) treatment was adopted on the basis of Samprapti (pathogenesis), Nityavirechana (medicated purgation) with T. churna – 10 gms & Sarvanga Udwartana (rubbing with dry powder) with T. churna (QS) was done for 7 days. The kapha (phlegm) increasing etiologies will also increase Meda, this Medas when vitiated deposited as Durmedas (adipose tissue) is use of Vatadosha (adipose) (8. Su.23/8–9). The line of treatment for Meda roga (diseases occurred in vitiated fatty tissue) is use of Shleshma-medohara (reduction of Kaphadoshas and fatty tissue), Vataghna (pacifying Vatadosha), Ruksha-Ushna-Tikshna Virechana (medicated purgation with rough, hot potency and penetrating properties) [13].

Udwartana i.e, rubbing the medicated powder over body in the opposite direction of the hair root. It causes Kapha-meda vilayana (liquefication of Kapha and Medas), sthirata of body (stability), twak prasadana (nourishment of skin) [14].

Virechana was performed using Triphala which has the quality to eliminate both Pitta and Kapha(13. Su.6/159). It is indicated in Prameha, also acts as mild astringent which aids in weight loss. At the same time, udwartana using Triphala was done because body fat and weight loss can be achieved by usage of Triphala. It was found to be effective in diabetes as it reduces blood sugar and insulin levels because of its hypoglycaemic potentials [15]. Hence Triphala was selected for both udwartana and nitya virechana.

Nishakatakadi Kashaya 15 ml tid was used due to its anti-diabetic action [16]. Amlakyadi compound 1 tsf bd was used in which ingredients such as Gokshura (Tribullus terrestris) which possess bastishodhana (cleansing) effect reduces Avarna of Kapha and Meda in the microcirculation of kidneys [17]. Vanga bhasma also helps to pacify Kapha and is useful in diabetes [18]. Amlaki (Emblica officinalis G.) and Gaduchi (Tinospora cordifolia) have been used for their anti-inflammatory and antioxidant action [19,20]. Daruharidra [21] (Berberis aristata) acts by decreasing oxidative stress hence useful in this condition. To attain immunomodulatory effect, Yashtimadhu (Glycyrrhiza glabra) was used and it is also an anti-diabetic [22,23]. Combined prescription of Nishakatakadi Kashaya and Amlakyadi compound had proven to be synergistic with former having disease specific effects and latter had helped in breaking the samprapti (Pathogenesis) of the disease.

Dietetic regimen that includes exclusion of foods that are high in sugar, including Pathyahara, eating smaller portions, thorough the day, adding variety of whole grain foods, fruits and vegetables everyday helped in maintaining the blood sugar levels in desired range [24]. Millets which contain high proportion of soluble dietary fibres case reduction in gastric emptying and absorption of glucose after a meal, resulting in improved glucose tolerance. Intake of millets helps with satiety but yet its not be high in calories (guru ch aatarpana). Lotus seeds (Makhane as snacks) contain some alkaloids and flavonoids with anti-obesity and hypolipidemic effects [25].

Yoga practice was prescribed from a prevaiadated standard protocol which is proven to be effective as well as it efficient for the patient in terms of cost, time and efforts. Many studies have used discrete yoga protocols that are proven to be effective when used for longer duration. The protocol used for the patient was specifically chosen for achieving results in relatively shorter duration of time. Certain breathing practices, loosening practices, Asanas, kriyas, Surya namaskara, Pranayama, deep relaxation techniques and meditations were advised in which the slow breathing technique in pranayama causes comprehensive changes in body physiology by controlling the autonomic nervous system [26]. Suryanamaskar regularizes the flexibility and postural balance mechanism [27] which is directly helpful to counteract obesity. Pranayama alone has shown to offer

| Table 2 | Ayurvedic management on the case of T2DM. |
|-----------------|----------------------------------------|
| Panchakarma Procedure | Method of Preparation | Method of administration | Treatment Duration |
| Nitya virechana with Triphala Churna | 10-g Powder of Triphala | Powder of Triphala 10 g administered after 20 min of night meal along with warm water. | 7 days |
| Sarvanga udwartana with Triphala Churna | Powder of Triphala-Q. S Approximately 200 g per day | Rubbing of the dry powder of Triphala to whole body empty stomach in the morning. | 7 days |

| Oral medication | Details of Oral medication(ingredients) | Dose | Anupana | Treatment duration |
|-----------------|--------------------------------------|------|---------|-------------------|
| Nishakatakadi Kashaya | Nisha (Terminalia chebula Retz.), kathaka (neemegia catechu), amalaka (emblica officinalis linn.), Parant (taura coccinea), lodhira (symplocos racemosa), badhrika (aerva lanate), Peetika (Salacia oblanga), usira (chrysopogon zizanioides) | 15 ml Tid | Luke warm water | 1 year |
| Amalakyadi compound | Amalaki (emblica officinalis linn.), Gokshura (tribullus terrestris), Sariva (hemidesmus indicus), Gaduchi (tinospora cardifolia), Chopachini (smilax glabra), Haridra (Curcuma longa Linn.) Daruharidra (berberis aristata), Yashitmadhu (glycyrrhiza glabra), Vangabhasma (tin) | 1tsf BD | Luke warm water | 1 year |
number of beneficial health effects including stress relief and improvement in cardiovascular functions [28]. Yoga causes Para-sympathetic activation which in turn helps to achieve overall metabolic and psychological improvement through stress reduction, increased insulin sensitivity, and improved glucose tolerance and lipid metabolism [29,30].

This integrated approach which contains oral Ayurvedic drugs, Panchakarma procedures, Yoga protocol and Ayurveda diet were

### Table 3
Ayurveda Pathyahara.

| Sample Menu Plan | 1200 Kcal (+ or – 50 Kcal) Per day | Protein: 45 gm/day (+ or – 5 g), CHO: 195 gm, Fat: 26.5 gm/day |
|------------------|-----------------------------------|---------------------------------------------------------------|
| **Timing Food Diary** | **Menu** | **Serving** |
| **Morning Drink** | 1. Herbal Infused Drink | 150 ml (1 glass) |
| B/w 6.30 am – 7 am (Any One) | 2. Ginger Lemon water | 100 ml |
| | 3. Cinnamon water | 100 ml |
| | 4. Chia seed Water | 100 ml |
| **8 am – 9 am** | 1. Besan Dosa(Tomato Omlette) | 1 bowl/1 plate |
| Breakfast options (Any one) | + Herbal Chatni | 2 tbsp |
| | + Sambar | 1 wati |
| | 3. Barley/Whole wheat chapati | 1 in no |
| | + Herbal/coconut Chatni | 2 tbsp |
| | + Sambar | 1 wati |
| | 4. Millet Dosa/idli | 1 in no/2 in number |
| | + Herbal/coconut Chatni | 2 tbsp |
| | + Sambar | 1 wati |
| | 5. Millet Vegetable Upma | 1 bowl/1 plate |
| | 6. Moong dosa | 1 in no |
| | + Herbal/coconut Chatni | 2 tbsp |
| | + Sambar | 1 wati |
| Mid-Morning Snack | Breakfast with Herbal/Cardamom/Green Tea without sugar | 1 cup |
| **Lunch** | 1. Medicated Buttermilk (Spiced with Ginger, Pepper, Rock salt and Jeera) | 1 glass (150 ml) |
| 1pm to 2 Pm | + Jowar/Bajra Roti | 1 bowl |
| | + Vegetable Sabji | 1 wati |
| | + Boiled Pulses Sabzi/Junka/moong Dal | 3/4th katori |
| | + Peanut/Methi/Flax Chatni | 1 tbsp |
| **Mid Evening Snack** | 1. Apple/unripened Pear Fruit | 1 medium Size |
| 4.30 pm – 5 pm (Option-Any one) | + Almond | 4 |
| | + Walnut | 2 |
| | + Green Tea/Lemon tea without Sugar | 1 cup |
| | 2. Ghee Roasted makhana spiced with Rock salt + Turmeric (Lotus flowers) | 1 cup |
| | + Almond | 2 |
| | + Walnut | 2 |
| | + Green Tea/Lemon tea without Sugar | 1 cup |
| | 3. Churmura + Unsalted Roasted Pea nut | 1 plate/1 handful |
| | + Green Tea/Lemon tea without Sugar | 1 cup |
| **Dinner (7 pm – 8 Pm)** | 1. Salad (spiced with lemon, pepper, rock salt) | 1 bowl |
| (Option-Any one) | + Herbal Soup | 1 bowl |
| | 2. Millet Kichdi | 1 bowl |
| | + Herbal Raita | 1 Katori |
| | 3. Millet Rice | ½ Wati |
| | + moong dal | 1 wati |
| | + Herbal Raita | ½ wati |
| | 4. Salad (spiced with lemon, pepper, rock salt) | 1 bowl |
| | + Moong Soup (spiced with Pepper and Rock Salt) | 1 bowl (150 ml) |
| | + vegetable pulao | 1 bowl |
| | 5. Moong Khichdi | 1 bowl |
| | + Salad (spiced with lemon, pepper, rock salt) | 1 bowl |

| **Menu** | **Exchange** | **Gram** | **Calorie** | **Protein** | **CHO** | **Fat** |
|----------|-------------|---------|------------|-----------|-------|-------|
| Cereals  | 3           | 90      | 300        | 9         | 54    | 2.1   |
| Rice     | 2           | 60      | 200        | 5         | 46    | 0.4   |
| Pulses   | 2           | 60      | 180        | 13        | 30    | 1     |
| Buttermilk| 1           | 100 ml  | 26         | 2         | 2     | 1     |
| Curd     | 1           | 100     | 62         | 4         | 4     | 3     |
| Vegetable| 4           | 400     | 160        | 8         | 26    | 1.7   |
| Fruits   | 1           | 50 – 75 | 50         | 1         | 10    | –     |
| Oils and Fats | 3       | 15      | 135        | –         | –     | 15    |
| Nuts and oilseeds | 1    | 20      | 100        | 3.5       | 5     | 7.5   |
| Total    | -           | -       | 1213 kcal  | 45.5 gm   | 177 gm| 31.7 gm|

*Note: Diet was customized as per the patient’s traditional food intake, regional availability etc.
helpful in treating the patient of DM. This approach may be taken into consideration for further research in DM.

8. Conclusion

Integrated Ayurveda treatment protocol containing Ayurveda medicines, panchakarma intervention, Ayurvedic pathyahara and yoga practise was helpful in treating type 2 diabetes mellitus. This approach can be adopted for T2DM treatment and research.

8.1 Patient perspective

The patient was satisfied with her health improvement. She was pleased with the healthy weight loss and retaining it for 4 months along with improvement in her energy level. Improvement in sleep quality and digestion, contributed to her perception of improved quality of life and recovery as a result of this holistic approach.

8.2 Patient consent

Written permission for publication of this case study had been obtained from the patient.

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None.

Conflict of interest

None.

Author contributions

Suketha Kumari: Software, Validation, Formal analysis, Writing – review and editing.

Laxmikant SD: Conceptualization, Methodology/Study design. Investigation, Resources, Writing – original draft, Writing – review and editing. Visualization, Supervision.

Sonika B: Conceptualization, Investigation.

Suman Khanal: Conceptualization, Investigation, Data curation.

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