

Multimodal ayurvedic approach in the management of type 2 diabetes mellitus in insulin therapy: A case report

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ABSTRACT

In the literature of Ayurveda, *Prameha* (diabetes mellitus [DM]) is a disease where derangement is seen in urine with respect to its quantity and quality. The basic pathology involved in the disease is the *Bahu*, *Abaddha Medas*, and *Kleda*. *Prameha* can be well correlated to DM with respect to its pathology and symptoms. Here, we present the case of a 44-year-old male who came with complaints of restlessness, generalized weakness, giddiness, and pain in bilateral calf muscles for the past 4 months. Based on Ayurvedic examinations, he was diagnosed to have Margavaranajanya *Madhumeha* (~obese diabetic). Suitable food, lifestyle, and medications were advised after assessing *Prakriti*, *Dosha*, etc. By Ayurvedic therapy, considerable improvement was seen in the quality of life. The case was followed up for 4 years and the patient's condition was maintained well throughout, without any complications. This article reports a case of Type 2 DM on insulin therapy which was completely managed by Ayurvedic therapeutic modalities and all the oral hypoglycemic drugs along with insulin were withdrawn gradually during the course of the treatment.

Key words: Ayurveda, Case report, Homeostatic model assessment-insulin resistance, *Madhumeha*, Quality of life index

In the Ayurvedic literature, the diseases afflicting urine are classified into two categories: One leading to excessive excretion of urine and the other leading to reduced flow of urine. *Prameha* (diabetes mellitus [DM]) is a *Mutatipravrittajaroga* (a disease with excessive urine flow). It is subdivided into 20 types based on the physical abnormalities of urine. However, all *Pramehas* if neglected may lead to *Madhumeha* in the long term, which is incurable and involves excessive retardation of immunity [1]. *Acharya Charaka* has very specifically described types of *Prameha* based on the onset of disease, as *Jatah Prameha* and *Apathyanimitaja Prameha*, which can be well correlated to Type 1 and Type 2 diabetes, respectively. In *Prameha*, the aggravated *Kapha* (nourishing element and immunity humor) spreads all over the body quickly because of flaccid muscles and fatty tissues. It blends with the *Medas* (Fat), primarily because the fat typically is excessive in quantity and viscous. As *Kapha* itself is vitiated, it also vitiates *Medas* in the process. This combination then mixes with *Mamsa* (muscle tissues) and *Kleda* (moisture/body fluid).


Vitiation of the muscle tissues provides a congenial atmosphere for the manifestation of putrefied carbuncles. Liquid components of the body get further vitiated and transform into the urine. This results in the manifestation of *Prameha* which

becomes chronic and incurable. In Ayurvedic texts, treatment of this chronic illness has been explained in detail by emphasizing on dietary modifications and physical activities. Here, we present the case of a 44-year-old diabetic male who was completely and successfully managed by Ayurvedic therapy.

CASE REPORT

A 44-year-old married male patient, hailing from an upper-middle class family, came to diabetes and metabolic disorders clinic, with complaints of restlessness, generalized weakness, giddiness, and moderate cramping pain in bilateral calf muscles for the past 4 months. It was a diagnosed case of DM type 2 (DM T2) from a reputed government tertiary care allopathic hospital. The patient had a negative family history of DM T2 and other metabolic disorders. His job was having a mild-to-moderate amount of work-related stress. Previously, the patient was on 10 IU Lantus insulin i.m BD and tablet metformin hydrochloride, 500 mg twice a day before food, and Nervz-B tablet 1 tab OD which contains Vitamin B such as methylcobalamin, alpha lipoic acid, benfotiamine, pyridoxine, folic acid, and chromium.

On the 1st day of the visit, he had fair general conditions, with him being uncomfortable because of pain in the bilateral calf region. He had a tendency of excessive sweating and unpleasant body odor. The patient had clammy skin and was observed to be

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mildly dehydrated over oral mucosa. According to the patient's words, he was physically healthy and had put on 5–7 kg body weight in the recent past. However, he lost almost 5–6 kg during the course of the disease and allopathic treatment. He had occasional mild exertional dyspnea on doing activities such as climbing 20–30 stairs or brisk walk for 20 min.

All the parameters of the general physical examination were within normal limits. Vital signs were normal with a pulse rate of 88/min, blood pressure of 140/80 mmHg, regular respiratory rate at 18/min, and regular heart rate at 88 bpm. The pulse was regular and palpable at all the sites, showing no signs of arterial occlusion. The patient was afebrile, conscious, and well oriented to time, place, and person. He had a body mass index of 31.21 kg/m² initially which reduced to 28.30 kg/m² after the onset of the disease. His sensation for pain and position sensing was mildly hampered in bilateral lower limbs. The pain sensation was hampered at the dermatomes L4, L5, S1 of feet. Vibration sensation was hampered at the great toes. He did not have any skin manifestations such as acanthosis nigricans and carbuncles. He had no abnormality in other systemic examinations.

At the onset, the patient was diagnosed to have dyslipidemia with raised cholesterol at 249 mg/dl and LDL at 176.40 mg/dl (Table 1 and Fig. 1). The patient was diagnosed with DM T2 with dyslipidemia. The patient was put on insulin therapy along with oral hypoglycemic drugs (OHDs) and multivitamin supplementation. The patient continued the same medications for the next 4 months. There was a considerable reduction in the blood sugar levels (BSLs) but subjectively, the patient continued having restlessness, generalized weakness, giddiness, pain, and had a compromised quality of life and thereby was advised to continue insulin for another 6–8 months.

The patient opted for Ayurvedic system of medicine by himself and visited OPD with the above complaints. Later, the patient was assessed based on the Ayurvedic approach of disease and patient examination (Table 2) and was prescribed with a suitable diet, lifestyle modifications, and medicaments.

At the foremost, the patient was thoroughly advised regarding required changes in the diet and physical activities including working pattern at the office. Before beginning the treatment, the patient was advised to undergo gut cleansing with *Triphala Kwatha* (40 ml) and *Trivrit Avaleha* (15 g) in the morning empty stomach for 3 consecutive days. This medication was chosen based on the dominant *Kapha-Pitta-Dosha* and the dose was decided based on the *Koshta* (bowel pattern) of the patient. He was advised to do a minimum of 5 km of cycling every day along with a minimum of 40 min of yoga practices. He was also advised to take short breaks for 15 min in the office and perform few stretching exercises. Specially, *Yogasanas* such as *Setubandhasana*, *Gomukhasana*, *Paschimottanasana*, *Halasana*, *Bhujangasana*, *Mandukasana*, *Bhramari*, and *Anuloma Viloma Pranayama* were advised to the patient.

All the dairy products were restricted except cow milk and ghee. Milk was allowed to consume, maximum of 150 ml, 4 times a week, and boiled with turmeric. Carbonated drinks, fermented, baked junk food, and fried and grilled food were completely

avoided. He was recommended to consume *Yava-Godhuma Rotika* (Pancakes made of Barley and wheat flour), *Mudga Yusha* (Whole grain Green Gram soup) prepared by adding 5–6 g of *Amalaka Churna* (Powdered Indian Gooseberry), and frequent consumption of *Yava Saktupana* (Energy drink made of roasted Barley). Very few fruits were recommended such as Jamun, Apple, and Nashpathi. After bowel cleansing, he was prescribed with following medicines, *Nishakatakadi Kwatha*, *Jamun Beeja Churna*, *Sudarshan Churna* (*Crinum latifolium*) + *Musta Churna* (*Cyperus rotundus*), and *Chandraprabha Vati*.

Later during the follow-up, *Meshashringi Churna* was added to the prescription. Tablet *Shilajatwadi Lauha* was chosen as *Vyadhihara Naimittika Rasayana* (disease-specific rejuvenator) and prescribed for next year as it has *Shilajathu* (Asphaltum) and *Swarnamakshikabhasma* (copper iron sulfide) which are *Lekhaniya* and *Rasayana*. The patient complied with all the instructions given by the physician. Near-complete resolution was seen in subjective symptoms at the end of 6 months. The patient performed vigorous physical activities with strict adherence to the advised diet. The physician was able to withdraw all the allopathic medications at the end of 1 year.

By the following medications, there was a significant improvement in the quality of life (Tables 2 and 3). Insulin resistance was assessed by homeostatic model assessment-insulin resistance and got considerably reduced from 6.5 to 2.2. The considerable reduction was also seen in the monetary expenditure done on the medications too. Gradually, the patient was able to cope up with his daily activities and the above-mentioned complaints reduced and disappeared in a course of 6 months. Necessary biochemical investigations were periodically carried out to monitor the condition. Along with the consultation and approval of the former, allopathic consultant, insulin therapy, and OHDs were steadily reduced in dose and duration and finally withdrawn completely in a period of 6 months. Later, the patient was kept on Ayurvedic medicaments alone for the next 3 years, and now, the patient is physically fit with investigation reports in near-normal limits. BSL is under control (PPBS 440 mg/dl to 128 mg/dl), and currently, the patient is being completely managed by the Ayurvedic management protocols.

DISCUSSION

DM is a group of metabolic diseases characterized by hyperglycemia resulting from defects in insulin secretion, insulin action, or both. The International Diabetes Federation estimates that 1 in 11 adults between 20 and 79 years had DM globally in 2015, with 14 million more men than women (198 million men vs. 184 million women) [2]. Experts expect the prevalence of DM to increase from 415 to 642 million by 2040, with the most significant increase in populations transitioning from low- to middle-income levels [3]. It is associated with long-term damage, dysfunction, and failure of different organs, especially the eyes, kidneys, nerves, heart, and blood vessels. Several pathogenic processes are involved in the development of diabetes. The basis of abnormalities in carbohydrate, fat, and

Table 1: Timeline of investigations and treatment

Date	FBS	PPBS	RBS	HbA1C %	FPI (miIU/L)	FPG (mg/dl)	HOMA-IR	Remarks	Medications
July 13, 2015			305						Lantus Insulin 10U BD IM T Metformin Hydrochloride 500 mg bd Multivitamin supplementation
July 14, 2015	266	440		11.90	9	292	6.5		-----"-----"
July 28, 2015	93	72							-----"-----"
October 24, 2015	106	66		9.20					-----"-----"
November 20, 2015								Started Ayurvedic medicine	Triphala Kwatha with Trivrit Avaleha for koshta shodhana Nishakatakadi kwatha Jamun beeja churna Sudarashana churna + musta churna Chandraprabha vati
June 01, 2016	108	129			7	130	2.2	Subjective symptoms reduced	-----"-----"
August 22, 2016	180	210							-----"-----"
January 12, 2017	130	146		6.8				Allopathic medicine withdrawn	-----"-----"
March 12, 2017	122	156						Continued Ayurvedic medicines	Vyadhihara naimittika rasayana Shilajatwadi lauha
September 19, 2017	123	191							-----"-----"
January 01, 2018			119	6.4					-----"-----"
June 18, 2018			140	6.6					-----"-----"
May 23, 2019	98	118	130	6.4					-----"-----"
December 16, 2019	108	128		6.6					-----"-----"

RBS: Random blood sugar, FBS: Fasting blood sugar, PPBS: Postprandial blood sugar, HbA1C: Glycosylated hemoglobin, FPG: Fasting plasma glucose, FPI: Fasting plasma insulin, HOMA-IR: Homeostasis model assessment insulin resistance

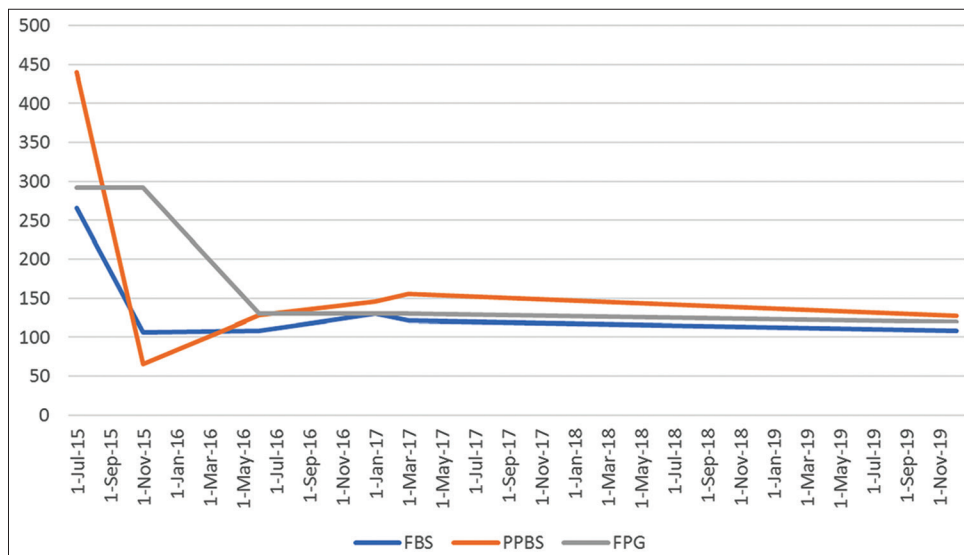


Figure 1: Blood and plasma glucose levels during the course of treatment and follow-up. FBS: Fasting blood sugar, PPBS: Postprandial blood sugar, FPG: Fasting plasma glucose

Table 2: Ayurvedic assessment of immunity and body tissues

Assessment criteria	Bt	At 3 months	At 6 months	At 9 months	At 1 year	At 2 years	At 3 years
Ojo dushti (immunity)							
Ojo visramsa- shrama, sandhi vishlesha, gatra sadana	3+	2+	-	-	1+	-	-
Ojo vypata – guru gatrata, nidra	2+	1+	-	-	-	-	-
Ojo kshaya – rasa kshaya, mamsa kshyaya	2+	2+	1+	1+	-	-	-
Agni bala (digestive capacity)							
Jaranshakti – udgara shudhhi, utsaha, laghuta, yatha kala kshudha, trishna,	-2	1+	2+	3+	3+	3+	3+
Abhyavaharanashakti	-3	1+	3+	3+	3+	3+	3+
Ruchi hi aaharakale	-2	2+	2+	3+	3+	3+	3+
Vata mutra purisha retsam mukti	-3	-1	1+	2+	3+	3+	3+
Dhatusamya laxana (features of homeostasis)							
Rugupashaman	-	1+	2+	3+	3+	3+	3+
Swara varna yoga	-	-	1+	2+	3+	3+	3+
Shariropachaya	-	1+	1+	2+	3+	3+	3+
Bala vriddhi	-	1+	1+	2+	3+	3+	3+
Nidralabho yathakalam	-	1+	1+	2+	3+	3+	3+
Vikara swapna adarshana	-	1+	2+	3+	3+	3+	3+
Sukhena cha pratibodhana	-	1+	1+	2+	3+	3+	3+
Mana buddhi indriya avyapatti	-	1+	1+	2+	3+	3+	3+
Mutravaha srotas (urinary system examination)							
Mutravaivarnya	2+	1+	-	-	-	-	-
Pipaasa	3+	2+	1+	1+	-	-	-
Atisrishta	3+	2+	2+	1+	-	-	-
Bahala	3+	2+	2+	1+	-	-	-
Knadu	2+	1+	1+	1+	-	-	-
Swedavaha srotas (skin and sweat gland examination)							
Shlakshnangata	2+	1+	1+	-	1+	-	-
Kandu	2+	1+	1+	-	-	-	-
Paridaha	2+	2+	1+	1+	-	-	-
Daurgandhya	2+	2+	1+	1+	-	-	-
Udakavaha srotas (water and fluid compartment examination)							
Talu shosha	3+	2+	1+	1+	-	-	-
Kantha shosha	3+	2+	1+	1+	-	-	-
Ati trishna	3+	2+	1+	1+	-	-	-

3+ – severe, 2+ – moderate, 1+ – mild. Agnibala - -3 – severely hampered, -2 – moderately hampered, -1 – mildly hampered, 1+ – mild improvement, 2+ – moderate improvement, 3+ – completely resolved

Table 3: Quality of life instrument for Indian diabetes patients (QoLID) [12]

Assessment criteria	Bt	At 3 months	At 6 months	At 9 months	At 1 year	At 2 years	At 3 years
Limitation due to physical health	20/30	24/30	24/30	26/30	26/30	28/30	28/30
Physical endurance	22/30	25/30	28/30	28/30	28/30	28/30	28/30
General health	7/15	9/15	12/15	13/15	13/15	13/15	13/15
Treatment satisfaction		18/20	18/20	-	-	-	-
Symptom bothersome	5/15	10/15	10/15	12/15	14/15	14/15	14/15
Financial worries	11/20	18/20	18/20	18/20	18/20	18/20	18/20
Emotional/mental health	21/25	21/25	-	-	-	-	-
Diet satisfaction	9/15	11/15	11/15	11/15	-	-	-

protein metabolism in diabetes is deficient action of insulin on target tissues [4].

Etiological factors of *Prameha* are consumption of diet dominant in sweet, salt, and sour tastes and lifestyle such as sitting

and sleeping continuously [5]. These are similar to the etiologies quoted as, overeating, eating of a large amount of carbohydrates mainly sugar rich substances, and sedentary lifestyle practices. With the advancement of the disease, all types of *Prameha* may

Table 4: Ayurvedic etiology of disease

S. No.	Nidana	Duration before to onset of disease	Guna	Dosha
1	Pishtanna (frequent biscuits intake)	3 years	Guru, snigdha, shita	Kapha
2	Vyayama varjana	8 years	Guru, manda, sthira	Kapha
3	Asya sukha (sedentary life with sitting for longer duration)	8 years	Guru, manda, sthira	Kapha
4	Ati guru anna sevana (soaked channa)	3 years	Guru	Kapha
	Ati guru pana (smoothie)	3 years	Guru, snigdha	Kapha
5	Ati snigdha anna sevana (oily, cheese food)	3 years	Snigdha	Kapha, pitta
6	Samshodhana akurvutam	Never took samshodhana	Srotaso avarodha	Kapha
7	Dhadhi (curds)	Twice a day×12 years	Snigdha, ushna, drava, sara	Pitta, kapha
8	Nava anna (basmati rice)	12 years	Guru	Kapha
9	Mahisha ksheera	3 years	Guru, shita, snigdha	Kapha

lead to *Madhumeha* which is said to be incurable. It clearly denotes the stage of insulin dependence. The narration of *Apathya Nimittaja Prameha* (~Diabetes caused by improper food and lifestyle) which generally is seen in obese individuals has a clear-cut resemblance with type-2 diabetes. Avoidance of cleanliness and exercise, indulgence in sleeping, sedentary habits, and other factors which are likely to increase *Kapha*, *Medas*, and *Mutra* are the causative factors of *Prameha* (Table 4).

Drugs present in the *Nishakatakadikwatha* are mainly *Kapha-Pittahara* in nature. Principally, the drugs are *Tikta*, *Kashaya rasa* (Bitter and Astringent), *Shitavirya* (~Cold potency), *Laghu* (~Light), and *Vishadaguna* (~Cleansing). This combination was chosen as this will bring down the vitiated *Pitta-Kapha-Dosha* by reducing excessive sweating, bad odor, burning sensation, and by *Lekhana* (Scraping). *Shabaralodhra* (*Symplocos racemosa* Roxb.) in this formulation was also concluded to mediate the antidiabetic activity mainly through alpha-glucosidase inhibition, improve insulin sensitivity, with moderate antiglycation and antioxidant activity [6]. *Guggulu* and *Shilajathu* are the chief ingredients of *Chandraprabhavati* (CPV). Both these drugs are especially useful in the condition of *Avarana* (disease with obstructive pathology).

In a study, *CPV* exhibited an anti-hyperglycemic effect and attenuated alterations in lipid profile. The results support the use of *CPV* for the correction of *Prameha* in clinical practice [7]. They also have the property of *Medonilahara* (lipid lowering), *Lekhana*, *Balya* (Strengthening), *Rasayana* (Rejuvenator), and *Yogavahi*. *Jamun beejachurna* is *Kashaya*, *Guru* (Heavy), and *Grahi* (Flow reducer), thereby useful to reduce the urine frequency and quantity. The kernel of Black Jamun exhibited the highest (98.2%) antidiabetic activity followed by fruits (93.8%). Comparatively, seed contained higher inhibitory activity because of its kernel fraction [8].

Mustachurna is also *Lekhana*, *Grahi*, and *Pachanka* (digerster) and pacifies *DushtaMeda* and *Kleda* (Hampere Lipid and Body Fluids). The ethanolic extract of *Musta* at dose levels of 250 and 500 mg/kg body weight revealed significant antidiabetic activity, improvement in body weight, and reduction in elevated biochemical parameters such as serum glutamic

pyruvic transaminase, serum glutamic oxaloacetic transaminase, cholesterol, and triglyceride levels [9]. *Sudarshan Churna* has a maximum quantity of *Kiratatikta* (*Swertia chirata*) which is *Tikta*, *Shita*, and *Katu Paki Drvya* (Pungent), has an action to reduce burning sensation, itching, and diabetes. It has shown significant scavenging activity against malondialdehyde formation in rats providing evidence for the potent antioxidant activity [10].

Potential known disadvantages of insulin therapy are listed as multiple episodes of hypoglycemia and associated mortality, weight gain, and risk of cancer [11]. Current treatment modalities were able to regulate the previous symptoms and prevent the complications of disease and insulin therapy. Our case was followed up for 4 years, and the patient's condition was maintained well throughout and all the symptoms were under control. The patient was able to lead his life with more contempt and satisfaction as the disease symptoms were not hindering his daily activities.

CONCLUSION

A view has been advanced that drugs of Ayurveda may have an altogether different mode of action than insulin. It is just possible that by correcting lipid disturbance, they might be correcting the glucose disturbance. This report would like to conclude that the considerable improvement and prevention of complications were possible because of early Ayurvedic intervention, strict adherence to the exercise-diet, and medication schedule. Vigorous and continuous practice of yoga and other physical exercises played a significant and crucial role in the enhancement of health and restoration of healthy body tissues.

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