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Case Report

Ayurveda approach in the treatment of type 2 diabetes mellitus - A case report

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A R T I C L E I N F O

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A B S T R A C T

Diabetes mellitus is a growing concern all over the world. There are no many published literature available documenting the effectiveness of Ayurveda intervention on diabetes mellitus. This report is about a case in which successful reversal of diabetes mellitus was achieved in a patient who reported with glycosylated Hb percentage (HbA1C) as high as 14.87%. The patient had classical symptoms of diabetes mellitus viz. excessive thirst, fatigue and frequent urination. His fasting blood glucose level was 346 mg/dl and post prandial glucose level of 511 mg/dl. Further more his HbA1C was as high as 14.87%, thus diagnosed with diabetes mellitus. Based on his specific clinical symptoms the patient was diagnosed with *kaphaja prameha*. Treatment was given according to classical Ayurveda intervention for *kaphaja prameha*. The patient responded well to the treatment. His HbA1C reduced to 6.05% in a span of eight months. The case report shows the effectiveness of Ayurvedic intervention in diabetes mellitus. It is limited in its scope as it is a case report, nevertheless this can be taken up as an information that may lead to new research and advances in the field of clinical practice in Ayurveda.

1. Introduction

Diabetes is one of the major growing health challenges in India with an estimated population of 8.7 percent in the age group of 20–70 years.[1] In India, the number of people with diabetes increased from 26 million to 65 million in a span of 26 years from 1990 to 2016, which makes India a major contributor to the global burden of diabetes.[2] The evidence for use of Ayurveda to effectively treat diabetes mellitus is limited. Nevertheless there are several reports of glucose lowering effects with use of some herbal mixtures including Ayurveda medicines with no reported adverse events.[3] It is important to report successful individual cases from Ayurveda as they may provide an initial information that can serve the basis for a detailed multi centric studies to provide definitive answers. More over such efforts would add value to the field of research in Ayurveda and may result in the development of epistemologically sensitive methods in evaluating effectiveness of Ayurvedic interventions for specific disease conditions.

2. Patient information

On 10/03/2021, a 41-year-old, married, nonsmoking, non-alcoholic male patient reported to the out-patient department of Kottakkal Arya Vaidya Sala, Shivajinagar, Bengaluru, India. He had complaints of severe tiredness since the last 3–4 months. He had gradual loss of weight of approximately 13 kg without any apparent reason. He also complained of excessive sweating and body odor and preferred to lie-down and sleep always. He had increased urination along with turbidity in urine. He also complained of excessive thirst, dryness of mouth, throat and palate, sweet taste in mouth, burning sensation of hands and feet and night sweats. He said his sleep was disturbed owing to the frequent episodes of urination at night.

The patient was moderately built, healthy looking individual with good physic. He is an active sportsman. He had strong familial history of diabetes. Both his parents and two of his brothers were diabetic since 10 years or more. Appetite and bowel movements were normal. He had no other known diseases, and was not under any medications. There was no history of any interventions for the presenting complaints.

Abbreviations: HbA1c, Glycosylated hemoglobin.

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3. Clinical findings

The clinical examination revealed a blood pressure of 130/80 mmhg with pulse rate of 78 beats per minute. The patient weighed 72 kgs and his height was 168 cm. On palpation his abdomen was soft and non-tender. His tongue was coated. His cardiovascular and breath sounds was normal. The patient had a *pitta-kapha prakriti* (constitution) with an above average *samhanana* (body built) and *pramana* (body proportion). He had dense hair, good appetite and deep sleep.

4. Timeline

In the present case, treatment was continued for 8 months starting from 13/03/2021 to 31/10/2021. Table 1 shows the timeline of clinical symptomology/diagnosis along with the medication prescribed with respective dosage. Table 3 shows the timeline of follow-up, history and clinical outcomes.

5. Diagnostic assessment

The patient was subjected to fasting blood sugar test (FBS) and post prandial blood sugar test (PPBS) on 11/03/2021. It showed 346 mg/dl and 511 mg/dl respectively. Glycosylated Hb percentage (HbA1C) tested on 13/03/2021 showed 14.87%. Thus the patient was diagnosed with Diabetes mellitus by the Ayurveda physician at Kottakkal Arya Vaidya Sala.

Diabetes mellitus in this case was conceptualized as *prameha* (~syndrome that includes clinical conditions involving obesity, pre-diabetes, diabetes mellitus and metabolic syndrome). *Prabhuta mutra* (excess urine), *avila mutrata* (dense urine) are the general diagnostic symptoms of *prameha* perceived in this specific case. Some of the premonitory symptoms that indicated *prameha* as the diagnosis were *sveda* (excess sweating), *angagandha* (excess body odor), *anga sada* (malaise), *sayya sukherati* (feeling comfort in bed), *svapna sukherati* (feeling comfort in sleep), *jihwopadeha* (coated tongue), *galatalu shosha* (dryness of throat and palate), *kara pada daha* (burning sensation in feet and palm), *pipasa* (excess thirst), *tandra* (fatigue), *alasya* (lethargy) and *mukha shosha* (dryness of mouth).[4] As the patient expressed more of *pittaja* symptoms like *kara pada daha* and *pipasa* the disease can be categorized to *pittaja prameha.*

6. Prognosis

Pittaja prameha accordng to Ayurveda is considered as *yapya* (diseases that cannot be cured but managed with medications). The presented case of diabetes mellitus was severe as the HbA1C was 14.87%.

Table 2
List of abnormal blood parameters observed during second follow-up.

Sl. No	Test Description	Results
1.	Total bilirubin	1.50 mg/dl
2.	Direct bilirubin	0.55 mg/dl
3.	Serum Albumin	5.31 g/dl
4.	A/G Ratio,	2.2
5.	Total cholesterol	232.3 mg/dl
6.	LDL Cholesterol – Direct	122.3 mg/dl
7.	Triglycerides	200.9 mg/dl
8.	VLDL Cholesterol,	40.2 mg/dl
9.	TC/HDL	4.4
10.	LDL/HDL	2.6

7. Therapeutic intervention

The treatment for diabetes mellitus was initiated on 13/03/2021. The patient was naïve, without any usage of prior medications. The intervention for diabetes was OPD based Ayurveda medicines and more importantly diet regimen. He was advised to take two medicines viz. *Katakakhadiradi kashayam*, 15 ml mixed with 15 ml water bd 1 h before food with one *Chandraprabha Vati*. Along with these, the patient was advised to include a food supplement, Sprotone, 30 gm boiled in 100 ml water bd 15 min before food. Sprotone is a nutrient rich formulation designed with ingredients that has low carbohydrate content and is found to be effective for diabetes in clinical practice. The patient did not receive any allopathic medication before or during the course of treatment.

On 01/07/2021, the patient complained about bilateral knee joint pain which was diagnosed as early osteoarthritis of knee joint. There was no history of injuries. Rheumatoid arthritis wasn't considered as none of the other joints were involved and the patient did not had any relevant symptoms like tenderness, morning stiffness of joints, fever or loss of appetite. Gout was ruled out as the incidence of pain was neither sudden nor severe and there was no reduction in the range of motion in the joint. Similarly, septic arthritis was also ruled out due to the absence of symptoms related to infection like fever, localized redness, swelling, warmth and tenderness. The assumption was thus early osteoarthritic changes. He was thus prescribed with *Rasnasaptakam Kashayam* 30 ml mixed with 30 ml water hs along with *Shaddharanam tablets,* 1 tablet each bd after food. *Kolakulathadi choornam* was prescribed for topical application over the knee

Table 1
Timeline of chief complaints/diagnosis, medicines prescribed with dosage.

Sl. No	Days	Chief complaints/diagnosis	Ayurveda medicines
1	13/03/2021 to 26/04/2021	Diabetes mellitus	1. Katakakhadiradi kashayam 15 ml with 15 ml water, bd, 1 h before food 2. Chandraprabha vati, 1 bd, with kashayam 3. Sprotone 30 gms bd boiled in 100 ml water 15 min before food
2	27/04/21 to 01/07/2021	Diabetes mellitus	1. Katakakhadiradi kashayam 15 ml with 15 ml water, bd, 1 h before food 2. Chandraprabha vati, 1 bd, with kashayam 3. Sprotone 30 gms bd boiled in 100 ml water
3	02/07/2021 to 07/08/2021	Diabetes mellitus OA knees	1. Katakakhadiradi kashayam 15 ml with 15 ml water, bd, 1 h before food 2. Sprotone 30 gms bd boiled in 100 ml water *3. Rasnasaptakam Kashayam* 30 ml mixed with 30 ml water hs *4. Shaddharanam tablets,* 1 tab each bd after food. *5. Kolakulathadi choornam* topical application over the knee joint (15 g mixed with hot water)
4	08/08/2021 to 30/10/2021	Diabetes mellitus Burning neuropathy	*1. Katakakhadiradi kashayam* 15 ml with 15 ml water once daily before lunch 2. Sprotone 30 gms bd boiled in 100 ml water 15 min before food *3. Guluchyadi kashayam* 15 ml with 15 ml water hs *4. Avipathykara choornam* 5 g mixed with the *kashayam* hs
5	31/10/2021 onwards	Diabetes mellitus	1. Katakakhadiradi kashayam 15 ml with 15 ml water, bd, 1 h before food 2. Chandraprabha vati, 1 bd, with kashayam 3. Sprotone 30 gms bd boiled in 100 ml water 15 min before food

Table 3
Timeline of follow-up history and clinical outcomes.

Sl. No	Timeline	Dates	Periodic clinical outcomes
1	Onset of treatment	13/03/2021	Ayurveda treatment started
2	First follow-up	26/04/2021	Tiredness, frequent urination, sweating etc reduced. Fasting blood sugar - 158 mg/dl Post prandial blood sugar - 220 mg/dl
3	Second follow-up	21/05/2021	Observational changes in signs and symptoms. Marginal abnormalities in blood parameters (Table 2)
4	Third follow-up	01.07.2021	Further reduction in symptoms related to diabetes. HbA1C - 8.13% Mean blood glucose estimation - 191.6 mg/dl Complained of acute bilateral knee joint pain
5	Fourth follow-up	07/08/2021	Reduction in symptoms related to diabetes. Bilateral knee joint pain resolved completely. Complained of burning sensation both hand and feet.
6	Fifth follow-up	30/10/2021	HbA1C – 6.05% Mean glucose levels – 125.7 mg/dl Burning sensation of hand and feet resolved.

joint (15 g mixed with hot water). These medicines were prescribed for one month and later discontinued once the patient recovered from the problem.

On 07/08/2021, the patient complained of burning sensation in the hands and feet. The provisional diagnosis was burning neuropathy due to diabetes mellitus for which medications were prescribed for a month. This included *Guluchyadi kashayam* 15 ml with 15 ml water hs and *Avipathykara choornam* 5 g mixed with the *kashayam* hs. These medicines were later discontinued on 30/10/2021, owing to the patient's complete recovery from burning sensation of hands and feet. During these months the patient was advised to discontinue *Chandraprabha vati* and have *katakakhadiradi kashayam* 15 ml with 15 ml water, once daily before lunch so as to decrease the amount of medicines consumed. Sprotone was continued two times daily. The time line of the treatments delivered according to the complaints is shown in Table 1.

8. Follow-up and outcomes

The first follow up was after one month and 13 days from day1. The patient was stable, without any new complaints. His complaints of tiredness, frequent urination and sweating had reduced. His FBS and PPBS was 158 mg/dl and 220 mg/dl respectively, showing a satisfactory reduction of blood sugar levels. He was advised to take a complete blood count (CBC), liver function test (LFT), renal function test (RFT), serum electrolytes and lipid profile tests (LPT) for a basic medical assessment and report back for follow up after a month. He was also advised to continue the medicines for another 3 months and report back with a HbA1C report by July 2021.

After two months and eight days from the first visit, on 21/05/2021, the patient reported for his second follow up along with his CBC, LFT, RFT, serum electrolytes and LPT reports. The blood parameters that was marginally abnormal are as follows.

In the light of current blood picture, the patient was advised to reduce consumption of added sugars and salts in food, fried items, red meat, white flour and fatty/fast food. No new medications were prescribed as the blood report was only marginally abnormal.

After three months and 19 days from the first visit, on 01.07.2021, the patient came for his third follow-up. The patient reported further reduction in his symptoms. His HbA1C was 8.13% with a mean blood glucose estimation of 191.6 mg/dl. This time he complained of acute bilateral knee joint pain which was diagnosed clinically as osteoarthritis knee. Medications were promptly started for bilateral knee joint pain. This helped and the patient recovered completely in a months time.

After four months and 25 days from the first visit, during the fourth follow-up, the patient complained of burning sensation in the hands and feet. The diagnosis was burning neuropathy due to diabetes mellitus for which medications were prescribed for a month. This helped the patient to recover completely from the problem.

On 30/10/2021, after 7 months and 17 days from the first visit, the patient came for his fifth follow-up. His HbA1C reduced to 6.05% and mean blood glucose level was 125.7 mg/dl. All throughout the intervention, the patient was tolerant to the medicines prescribed and did not have any complaints or unanticipated drug reactions except stomach discomfort which got resolved in two days.

9. Discussion

In Ayurveda, *prameha* is understood as a *maharoga,* characterized as a disease which demonstrates an inheritance pattern5. Though there is an involvement of all the three *dosha*, the pathophysiology of *prameha* is majorly based on three factors viz. *kapha dosha*, *medo dhatu* and *mutra mala*. In *prameha,* due to the increase of *dravatva of kapha, kleda* increases resulting in the loss of *sthiratva* of *medo dhatu*. This leads to *dhatu shaithilya* eventually resulting in an irreversible diseased state, if left untreated for long period of time. The increased *kleda* accumulated in the body flows out through *mutra*. Thus the treatment adopted in Ayurveda is to reduce *kleda*, prevent *dhatu shaithilyam* and to restore *sthiratva* in the body. The areas of life that play a major role in both health and disease are *ahara* and *vihara*. It is important to consider these factors while treating any disease. Foods which are sweet, sour and salty increase *kapha*. Thus in an Ayurvedic perspective, it is important that a patient of *prameha* should refrain from consuming such food. In *vihara*, *vyayama* is important as it leads to *sthiratva* in the body.[5]

As the pathophysiological factor contributing to *prameha* is *dravatva* of *kapha*, the medical intervention is oriented towards increasing *rookshatva* in the body so as to reduce *kleda*. Accordingly, medicines of *tikta* and *kashaya* rasa were selected. *Katakakhadiradi kashayam* is one such medicine. *Chandraprabha vati* (formulation form the text *Bhaishajyaratnavali*) is a formulation which restores the balance in all the three *doshas*. It is also *balya*, *vrushya* and *rasayana* which specifically help in *prameha*.

Bilateral knee Joint pain reported by the patient was because of early osteoarthritic changes. This is considered as *kapha pradhana sandhigata vata. tikta rasa, ushna veerya* and *kapha haratva* of *Rasnasaptakam Kashaya* and *Shaddharana* tablets as internal medications along with *Kolakulathadi Choorna* for external application helped to manage the condition effectively.

Burning neuropathy must have been caused due to long standing high blood glucose levels. It is also found commonly in alcoholics and those suffering from vitamin B12 deficiency. This particular patient was not an alcoholic. His vitamin B12 levels were not evaluated as the problem resolved with the intervention, there by confirming the probable diagnosis of burning neuropathy. Burning neuropathy can be understood as *daha*. It is considered as one of the type of *pittaja roga*.[6] *Guluchyadi kashayam* is a formulation which is used in the treatment of *pittaja rogas* like *jwara, chardi, daha, trishna,* and *agnimandya*. It is a *tikta rasa, sheeta veerya, pitta kapha shamaka* and *rooksha* in nature. *Avipathy choorna* is yet another medication for *pittaja* disorders owing to its qualities viz. *katu tikta rasa*, *ushna veerya* and *pitta kapha haratva*. Refer [Appendix 1] for meanings of Sanskrit words used.

One major risk factor which goes unnoticed in patients newly diagnosed with diabetes is potential deficiency of micro nutrients. It is reported that, lesser the people eat to remedy the ill effects of a sedentary lifestyle, more inadequate the nutrients intake becomes. In diabetic patients, this is mainly due to the effort that they take to control blood glucose level through dieting. The most reported deficiencies are zinc, calcium, magnesium and folate.[7] This is worse in diabetic patients as their nutrient requirement is higher than that of healthy individuals. Sprotone is a combination of sprouted cereals (wheat and ragi), pulses (horse gram and green gram), condiments and oil seed (fenugreek and flaxseed). The rationale of such a formulation is that this would give the patient a good source of nutrients with low glycemic index.

10. Conclusion

Diabetes is a disease with significant global burden. In this particular case, in spite of extremely high blood sugar levels, we could manage the patient with Ayurveda medicines along with food alteration. This brought down the Hba1c level of the patient from 14.87% to 6.05% in the span of eight months. Thus it can be assumed that usage of anti-hyperglycemic drugs may not be necessary in all the cases of diabetes mellitus. Several more such case study reports are required followed by innovative research methods to analyze the effectiveness of Ayurvedic intervention for specific disease conditions. The attempt to document and publish studies like this would hopefully serve as a basis to inspire more researchers to use sensitive trial designs, in larger groups which can effectively investigate clinical efficacy of traditional health systems like Ayurveda.

Patient perspective

Through my readings, I got to know that Ayurveda treatment for diabetes is effective and have less side effects. The medicine and the sprotone taken during the treatment was really good and effective to reduce my glucose levels though has some stomach upset which got resolved later on. Sprotone is part of my diet now. Overall, I had a very good experience with the treatment and happy that my sugar levels are under control now. Doctor always suggested to be physically active by doing regular exercise along with the medicines. Thanks to the doctor for providing the treatment and all guidance.

Informed consent

Informed consent has been obtained from the patient to publish this case report.

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Conflicts of interest

None.

Author contribution

The author confirms sole responsibility for the following: study conception, data collection, analysis and interpretation of results and manuscript preparation.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jaim.2023.100744.

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