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CASE STUDY

Significance of Integrated Approach in the Preventive Aspects of Metabolic Syndrome Highlighted in Ayurveda

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ABSTRACT

Metabolic syndrome is a complex cluster of interconnected metabolic abnormalities that significantly increase the risk of cardiovascular diseases, diabetes, and other chronic conditions. *Ayurveda* is one of the traditional medical systems that has drawn attention for its holistic approach to treating illness. This paper is a case study demonstrating the effective use of *Ayurveda* therapies in the management of Metabolic Syndrome focusing on lifestyle modifications and herbal remedies.

Key Words *Metabolic Syndrome, Diabetes Mellitus, Early Renal Failure, Prameha*

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INTRODUCTION

Metabolic syndrome includes Dyslipidemia, Hypertension and Diabetes mellitus. Further progress of the condition could produce complications like Ischemic Heart Disease, Chronic Kidney Disease, Osteopenia and ultimately Osteoarthritis. Diabetic kidney disease (DKD), which is characterized as chronic kidney disease in a person with diabetes, is one of the most prevalent and serious long-term complications of diabetes. About 20–50% of Type 2 Diabetes mellitus patients eventually develop DKD. CKD affects more than 40% of T2DM patients while eGFR research reveals that over 80% of T2DM patients continue to have decent renal function (eGFR > 60 ml/min), which assures fewer boundaries when choosing oral anti-diabetic medications despite the significant percentage of T2DM patients with CKD[1]. Treatment for such condition is difficult in the mainstream science, in part because of alterations in insulin signalling, glucose transport and metabolism due to renal failure that favour both hyperglycaemic peaks and hypoglycaemia. Intensive glucose control lowers the risk of

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microalbuminuria and macroalbuminuria, but there fails to be enough data to suggest whether it minimises the risk of clinically significant renal outcomes like a doubling of creatinine, ESRD, or death from renal disease over the course of follow-up period. Additionally, the deterioration of renal function affects insulin metabolism and clearance, frequently necessitating a review of prescriptions. The management of hyperglycaemia in individuals with diabetic kidney disease is significantly more challenging and necessitates adjusting the dosages of insulin and antidiabetic medications[2]. Measures explained in Ayurveda could be used to prevent the occurrence of metabolic diseases to a large extent.

CASE REPORT

A female patient aged about 54 years was apparently normal before 2 months. She noticed complaints of swelling in the bilateral feet, especially in the morning and while feet hanging loose on the ground for long time. Gradually she developed puffiness around the eyes and oedema all over her body. She also observed that her urine output had reduced compared to the amount of fluid intake. She also complained of pain in right knee joint with occasional swelling in the past 1 week and pain in low back region with radiation till feet, in the past 35 years. She consulted a local physician and was diagnosed to have a renal pathology for which she was put on medication but did not find much relief. Due to non-reduction in the symptoms, she was also getting stressed and experienced disturbed sleep at night. So, for further management and betterment from her existing symptoms, she got admitted to SDM Ayurveda Hospital, Udupi. She was diagnosed with DM type II, Dyslipidemia, Hypertension, IHD, Lumbar spondylosis and Sciatica syndrome, Stress and Insomnia. Accordingly, treatment was planned.

Patient was a known case of Diabetes Mellitus and Hypertension from the last 12 years and Hypercholesterolemia from the last 6 years, on allopathic medication. Patient had a history of complete hysterectomy 8 years ago due to fibroid uterus.

The details of the General Physical Examination (Table No.1), Systemic Examination (Table No. 2), Local Examination (Table No.3), Personal History (Table No. 4), *Ashta Sthana Pareeksha* (Table No. 5), with *Samprapti Ghataka* (Table No. 6) has been briefly tabulated below:

Table 1 General Physical Examination

Built	**Overweight**
Nourishment	Well Nourished
Pallor	Absent
Pulse	74 bpm
Respiratory Rate	20/minute
Blood Pressure	130/80mmHg
Height	5'1"
Weight	65
BMI	28kg/m^2

Table 2 Systemic Examination

Central Nervous System	**Higher Mental Functions intact.** **Consciousness- intact** **Orientation to time, place, person – intact** **Cranial nerves- within normal limits**
Cardio-Vascular System	S1 S2 heard, regularly irregular rhythm. No added sounds heard.
Respiratory System	Normal vesicular breathing

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	sounds heard. Air entry bilaterally equal. No added sounds.
Gastro-Intestinal System	Per abdomen- soft, non-tender. No organomegaly.

Table 3 Local Examination

Test	Right Lower Limb	Left Lower Limb
Crepitus	+++	++
Straight Leg raise	Positive at 20 degrees	Positive at 45 degrees

Also, the X-ray Knee finding is suggestive of osteopenia.

Table 4 Personal History

Appetite	**Reduced**
Bowel	Once per day
Sleep	Disturbed
Micturition	Less output, dark yellow in colour, 2-3 times/ day, roughly 800mL/day.

Table 5 *Ashta Sthana Pariksha*

Nadi	***Pittavata***
Mutra	*Alpamutrata* – approximately 800-850mL/day
Mala	*Prakruta*
Jihva	*Alpaliptata*
Shabda	*Prakruta*
Sparsha	*Prakruta*
Drik	Peri-orbital swelling present
Aakriti	Oedema around knee and ankle

Table 6 Samprapti Ghataka

Dosha	***Apana, Samana and Vyana Vata; Pachaka, Alochaka and Bhrajaka Pitta, Rajo Dosha.***
Dushya	*Rasadhatu, Medodhatu, Mala - Mutra*
Agni	*Vishamagni*
Ama	*Jatharagni janya ama – present*
Srotas	*Rasavaha, Medovaha, Mutravaha*
Srotodushti	*Sanga, Vimargagamana*
Adhishthana	*Koshtha, Basti, Hridaya*
Udbhava Sthana	*Amashaya*
Vyakta Sthana	*Sarva Shareera*
Rogamarga	*Madhyama*

Intervention

The patient was administered the following treatment (see Table No.7 and Table No. 8):

Table 7 *Panchakarma* Procedures

S.N.	***Panchakarma* Procedures**	**Duration**
1	*Dashamoola Kashaya Basti*	*Kala Basti* pattern
2	*Matra Basti with Sahacharadi Taila*	
3	*Katibasti with Sahacharadi Taila*	*15 days*
4	*Nadisweda*	*15 days*
5	*Triphala Churna Udwartana*	*15 days*
6	*Takradhara*	*15 days*
7	*Vacha Haridra Dhoopa*	*15 days*

Procedure of *Vacha Haridra Dhoopa* – a teaspoonful mixture of *Vacha-Haridra Churna* was taken in a *Dhoopa Yantra* to which 2mL *Ghrita* and a camphor was crushed, mixed in the mixture and ignited. Once the flame went off, the *Yantra*, with the fumes coming out, was placed under the bed of the patient. The fumes emerge for a minimum duration of 15 minutes during when the patient is asked to normally respire in any comfortable posture.

Table 8 Oral Medications Advised

S.N.	Drugs	Dose	Duration	*Anupana*
1	*Trayodashanga Guggulu* DS	2-2-2	15 days	Water
2	*Ekangaveera Rasa*	1-1-1	15 days	Water
3	*Rasnaerandadi Kashaya*	10-10-10mL	15 days	With 10 mL water
4	*Arjunarishta*	15-15-15mL	15 days	With 30 mL water
5	*Punarnava Mandoora*	2-2-2	15 days	water

RESULTS

The following changes in the parameters were seen with the usage of only *Ayurveda* medicines (see Table No. 9):

Table 9 Before and After treatment changes in biochemical parameters

Investigations	Before Treatment	After Treatment
FBS	133mg/dL	100mg/dL
PPBS	248 mg/dL	174 mg/dL
Total cholesterol	235	179

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Triglycerides	387	257
VLDL	77	51
TC/HDL	5.8	4.7
Urine Sugar	0.5	Nil
Urine Albumin	++	++
Cast cells	Hyaline cast	Hyaline cast
Blood Pressure	140/90mm of Hg	130/80mm of Hg

The treatment modalities resulted in decrease of symptoms by about 30-40% over a period of 15 days.

DISCUSSION

As per National Kidney Foundation parameters, early renal failure diagnosis is done using the symptoms of excessive tiredness, cognitive impairment, insomnia, dry and itchy skin, reduced urine frequency, dark coloured and foamy urine, persistent puffiness around the eyes, pedal oedema, poor appetite and muscle cramping. Age related osteoarthritis along with pre-renal conditions could present as swelling, especially around the joints (knees). Though primary cause for the manifestation of Metabolic Syndrome could be understood as obesity - junk food and sedentary lifestyle could alter lipid levels leading to dyslipidaemia even though the patient was not obese. A popular class of medications used to decrease cholesterol has their primary mechanism of action by inhibiting HMG-CoA reductase, the rate-limiting enzyme in the cholesterol production pathway[3]. Metabolic Syndrome is counted as an adverse effect of long-term use of statins[4]. For the treatment of IHD, the most frequently used drug would be aspirin. Studies have shown that, prolonged Aspirin usage could also be associated with haemorrhagic adverse events, while some patients could also develop aspirin resistance and would not respond to the treatment[5]. Hypokalaemia and hyperuricemia are known to be the inherent side effects of diuretic therapy[6]. Frequent micturition, poor erection, headaches, insomnia and reduced sexual urge were the symptoms most related to ADR of using anti-hypertensives[7]. It has been discovered through studies that medicinal plants are more efficient than conventional drug compounds with no/fewer adverse effect and are also reasonably inexpensive[8]. Diabetes medicine does not show any marked role in preventing the complications of diabetes, especially in the renal complications. Hence, adopting early *Prameha Chikitsa* mentioned in the classical texts of *Ayurveda* is of prime importance. This case study exemplifies how *Ayurveda* may help in the treatment of Metabolic Syndrome, both in the ailment and the general health of the patient. Reduced salt and protein intake are among the evidence-based guidelines for CKD therapy that are consistent with the dietary and lifestyle changes encouraged by Ayurveda, which was also adopted in the patient. Adopting *Prameha Chikitsa* would also help in restoring the organ health and counters the metabolic syndrome as contrary to the contemporary approach to the treatment of Diabetes in long term treatment.

The probable mode of action of the administered treatment could be understood as follows:

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1. *Basti – Basti* is considered as *Ardhachikitsa* in *Vatavyadhi*. Hence Basti has a major role to play, especially in Arthritis as well as Metabolic Syndrome, as there is evident *Apana* and *Samana Vata Dushti* causing the major pathology. Here, *Dashamoola Kashaya Basti* was chosen as it works as best *Vatahara* and *Matrabasti* with *Sahacharadi Taila* was administered as the gait was hampered due to chronic pain.

2. *Katibasti* was planned with *Sahacharadi Taila* followed by *Nadisweda* to relieve the pain and improve the nervine functions of the lower limbs.

3. As there was marked *Medo Dushti* causing the pathology, *Triphala Churna Udwartana* was done. *Udwartana* ensures keeping *Kapha Dosha* and *Medodhatu* in check and also helps in proper mediation of cholesterol levels, which are the primary factors that need to be tackled when treating Metabolic Syndrome[9].

4. To relieve the stress and aid in proper sleep, *Takradhara* and *Vacha Haridra Dhoopa* were planned. *Takradhara* produces relaxation and natural sleep by increasing the intensity of alpha brain waves and decreasing brain cortisone and adrenalin levels. The procedure generates a conduction that acts as tranquiliser and induces sleep. It normalises serotonin, nor-epinephrine and the functions of the hypothalamus. It slows down sympathetic nerve activation which further slows down metabolic activity and glucose release into the blood. These actions thus help in managing the pathology of Diabetes as well[10]. A combination of *Vacha* and *Haridra* helps in improving cognitive focus, thereby controlling both stress and insomnia.

5. *Trayodashanga Guggulu* DS - contains bioactive substances such flavonoids and phenols that may be responsible for reducing inflammatory pain. The tablet contains some of the major ingredients like *Babula, Ashwagandha, Hapusa, Guduchi Shatavari* and *Gokshura* along with a major proportion of *Guggulu*. Using DS tablet indicates the tablet has a desired strength of all the ingredients. As it contains a major amount of *Guggulu*, it acts as an effective pain killer. The combined effect of all the drugs acts as anti-inflammatory as a result of which it helps in reducing swelling[11].

6. *Ekangaveera Rasa* – The qualities of *Ekangveera Rasa* constituents would be crucial in reducing the signs of aggravated *Vata* in *Vatavaha Srotas*. The phytochemicals in *Bhavana Dravyas* improve the qualities of the main ingredient and also have an impact on the mode of action of the drug. Due to their anti-inflammatory properties, *Amalaki, Pippali, Shigru,* and *Maricha* have the capacity to decrease nerve damage. The ingredients and *Bhavana Dravya* have anti-oxidants and atherosclerotic properties that can reduce the oxidative stress brought on by free radicals. Through the neutralization of the harmful effects of free radicals, they lower the risk of atherosclerosis, stroke, and hypertension. Due to its hypolipidemic effects, *Tamra Bhasma* lessens coagulation. Hence, this is a drug of choice in the present case[12].

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7. *Rasnaerandadi Kashaya* –This particular combination has major ingredients of *Rasna* and *Eranda*, both of which are well known to keep *Vata Dosha* in check along with other ingredients like *Bala, Shatavari, Vasa, Guduchi, Ativisha, Musta*, etc. The overall effect of the formulation is the reduction of *Vata* and *Shoola*, especially in the thighs, back and flanks along with the reduction in the swelling[13].

8. *Arjunarishta – Arjunarishta* regulates blood pressure and cholesterol, giving the heart muscle strength and promoting cardiac function by its *Hridya* property[14].

9. *Punarnava Mandoora* - majority of the medications found in *Punarnava Mandoora* have carminative, digestive, and appetizer qualities. As a result, it enhances digestion, which eventually leads to better nutrient and medication absorption. Additionally, it is also known to have immunomodulator and antioxidant characteristics[15].

CONCLUSION

Diabetes mellitus when treated through *Prameha Chikitsa* showed good improvement, including control of complications like the Metabolic Syndrome and renal complications.

Contemporary medical science understands diabetes only in the perspective of raised serum glucose level and antihyperglycemic agents would restrict this by blocking various physiology like gluconeogenesis, glucose uptake at gut etc. Hence it usually results in metabolic syndrome during the long run. But when the patient was administered *Prameha Chikitsa*, it was found to correct the metabolic activities by enhancing the physiological functioning as well, thereby tackling all possible complications of the disease course. This study could be further performed on larger sample size to draw valid conclusions.

The comparison between the before and after treatment laboratory investigation changes is displayed graphically below: Changes in Blood Glucose Levels (Figure No. 1), Changes in Fasting Lipid Profile (Figure No. 2), Changes in Urine Routine Level (Figure No. 3), Changes in BP and Insomnia Severity Level (Figure No. 4) -

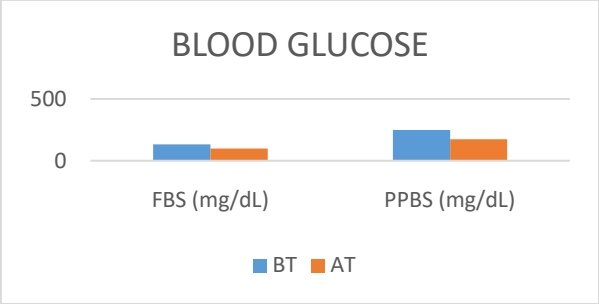

Figure 1 Changes in Blood Glucose Levels

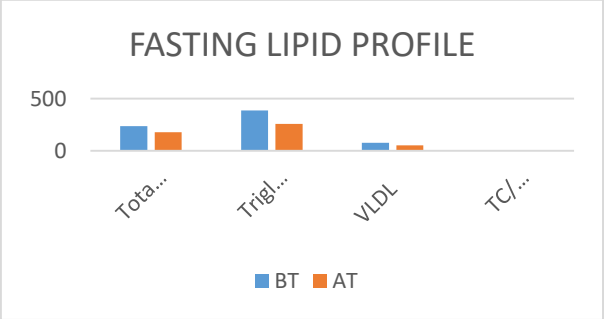

Figure 2 Changes in Fasting Lipid Profile

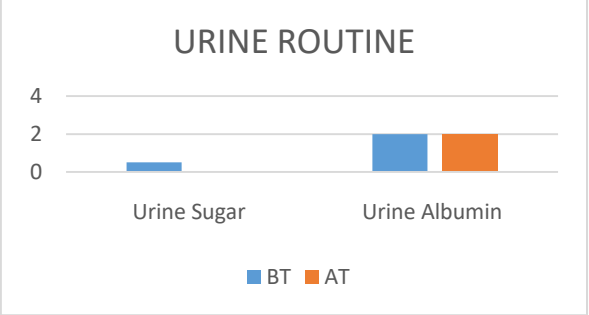

Figure 3 Changes in Urine Routine Level

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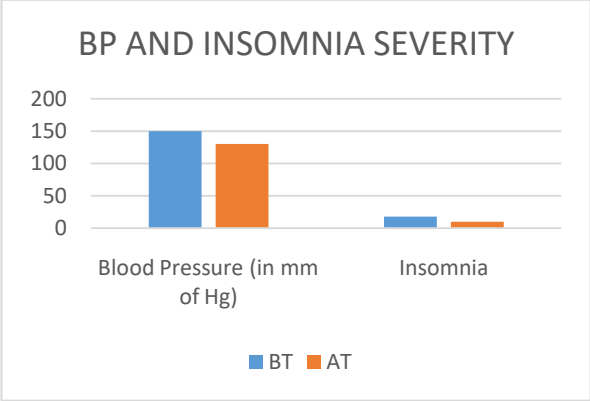

Figure 4 Changes in BP and Insomnia Severity Level

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