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Effect of Ayurvedic therapy in the management of Lower Limb Complications related to Diabetes Mellitus - A Case Study

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ABSTRACT

According to data presented by WHO, The global prevalence of diabetes among adults is projected to be 7.7% of (439 million) adults by 2030. Study estimated that 47% of patients with diabetes have some peripheral neuropathy and is estimated to be present in 7.5% of patients at the time of diabetes diagnosis. Diabetes is the leading cause of Non traumatic lower extremity amputations in India, with approximately 5% of diabetics developing foot ulcers each year and 1% requiring amputation . Various oral hypoglycaemic agents, insulin formulations, life style modification plans consisting of dietary management and exercise, are some of the important efforts towards the management of diabetes. In spite of fascinating advances in pharmaco-therapeutic agents, world is seeking for safer and effective remedies. Increased side effects, lack of effective treatment for complications, high cost of new drugs and resistance to the drugs are some reasons for renewed public interest in *Ayurvedic* medicines. Now the primary goal is not merely to achieve normoglycemia, but also to minimize its complications. *Basti karma* is one among the *Panchakarma* in *Ayurveda*. *Panchakarma* intervenes at the systemic level regardless of the tissue or organ involved in the pathology. Here the case study with diabetic peripheral neuropathy and vasculopathy has shown beneficial immediate and mid-term improvement after *Ayurvedic* treatments. The study provides early basis for larger studies regarding role of *Ayurvedic* treatment in management and prevention of DM related complications.

Key words: Diabetes Mellitus, Diabetic Peripheral Neuropathy, Vasculopathy.

INTRODUCTION

The number of people with diabetes worldwide was estimated at 131 million in 2000; it is projected to increase to 366 million by 2030.[1] Previous studies have indicated that diabetic patients have up to a 25% lifetime risk of developing a foot ulcer.[2] More than 60% of diabetic foot ulcersare the result of underlying neuropathy.[3] Diabetic neuropathy is a relatively early and common complication affecting approximately 30% of diabetic patients.[4] Although the invention of insulin and hypoglycemics have done a great service for diabetics, yet these patients do not get a proper solution for their neuropathic complications. The drugs used conventionally are mostly for relief in the symptoms and moreover they have certain side effects. Therefore it is necessary to explore the possibilities of safer and effective treatments from other sources.

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Pathogenesis of Neuropathy[5]

The development of neuropathy in affected patients has been shown in animal and in vitro models to be a result of hyperglycemia induced metabolic abnormalities. One of the more commonly described mechanisms of action is the polyol pathway. In the development of neuropathy, the hyperglycemic state leads to an increase in action of the enzymes aldose reductase and sorbitol dehydrogenase. This results in the conversion of intracellular glucose to sorbitol and fructose. The accumulation of these sugar products results in a decrease in the synthesis of nerve cell myoinositol, required for normal neuron conduction. Additionally, the chemical conversion of glucose results in adepletion of nicotinamide adenine di nucleotide phosphate stores, which are necessary for the detoxification of reactive oxygen species and for the synthesis of the vasodilator nitric oxide. There is a resultant increase in oxidative stress on the nerve cell and an increase in vasoconstriction leading to ischemia, which will promote nerve cell injury and death. Hyperglycemia and oxidative stress also contribute to the abnormal glycation of nerve cell proteins and the inappropriate activation of proteinkinase C, resulting in further nerve dysfunction and ischemia. Neuropathy in diabetic patients is manifested in the motor, autonomic, and sensory components of the nervous system. Damage to the innervations of the intrinsic foot muscles leads to an imbalance between flexion and extension of the affected foot. This produces anatomic foot deformities that create abnormal bony prominences and pressure points, which gradually cause skin break down and ulceration. Autonomic neuropathy leads to a diminution in sweat and oil gland functionality. As a result, the foot loses its natural ability to moisturize the overlying skin and becomes dry and increasingly susceptible to tears and the subsequent development of infection. The loss of sensation as a part of peripheral neuropathy exacerbates the development of ulcerations. Astrauma occurs at the affected site, patients are often unable to detect the insult to their lower extremities. As a result, many wounds go unnoticed and progressively worsen as the affected area is continuously subjected to repetitive pressure and shear forces from ambulation and weight bearing.

In Ayurvedic classics symptoms like *Suptata* (numbness) and *Daha* (burning sensation) in body parts especially in hands and feet are described as *Purvarupa* of *Prameha*.[6] *Daha* is also described among the *Upadravas*(complications) of *Prameha*.[7] These are very common features of diabetic neuropathy. According to *Ayurvedic* principles, there is involvement of *Vata* and *Pitta Dosa* in diabetic neuropathy.

Case history

Chief Complaints

The patient age 45 years male admitted to SDM Ayurveda Hospital, Udupi for the complains of pain and burning sensation over both lower limbs specially below knee, more during night and after walking since 4 month. Patient is known diabetic since 5 years

Associated Complaints

C/o occasionl giddiness and loss of interest in work since 2 month.

Something crawling sensation and numbness in the hands and feet since 2 monts.

History of present illness

A non hypertensive male patient aged about 45 years a known case of DM since 5 years (on medication) was apparently normal 4 month back. Gradually he developed burning sensation over feet later he started pain in the both lower limbs specially during night time (the pain was intermittent and catching type). Later since 2 months he also developed feeling of numbness over both hands and feet.

He consulted to allopathic doctor and advised for blood sugar investigation which was found to be 380mg/dl. Later started insulin doses of 10 unit bd, and was prescribed some other medication. He got relief for some time but after 20 days he started severe pain in both lower limbs associated with burning sensation. Now he got admitted to SDM Ayurveda Hospital, Udupi for further management.

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2 month back he also developed pain and abscess over Rt. heel after he got a thorn prick, which was drained by a surgeon. It took around 2 months to heal.

On medication

- Tab glucored forte 1 bd
- Insulin human mixtard 10 unit - 0 - 10 unit
- Ultraset 0 - 0 - 1

Presonal History

- **Diet:** Irregular food habit, non veg diet, daily intake of spicy food.
- **Appetite:** Normal Bowel : daily once
- **Micturition:** Normal
- **Sleep:** Reduced and disturbed sleep.

General Examination

- Consciousness : Intact
- Appearance : Ill look
- Nourishment : Nourished
- Pallor : Absent
- Icterus : Absent
- Cyanosis : Absent
- Clubbing : Absent
- Lymphadenopathy : Absent
- Edema : Absent
- Hair : Intact
- Nails : Intact
- Weight : 60 kgs
- Height : 5 feet 4 inches
- Gait : limping

Vital Signs

- Temperature : 98.8 F
- Pulse : 74/min
- Blood Pressure : 138/86mm of Hg
- Respiratory Rate : 20/min

Higher mental functions

- Consciousness: Intact
- Orientation to place, time, person: Intact
- Memory : Immediate, recent, remote : Intact

Cardiovascular System

- S1, S2 heard, No added sounds.
- Apex beat : Heard at Left 5th intercostal space.

Respiratory System

- NVBS, No abnormality detected

Ayurvedic Accessment

- *Prakruti: Vata Pittaja*
- *Desha: Aanupa Desha*
- *Kala: Greeshma Ritu*
- *Vyadhi Kala: Vyaktavastha*
- *Rogi Bala: Madhyam*
- *Roga Bala: Madhayam*
- *Saara: Madhyam*
- *Samhanana: Madhyam*
- *Pramana: 5.2* Feet, 56 Kgs
- *Satwa: Avara*
- *Saatmya – Madhyam* (*Sarvarasa Satmya* but likes *Katu*, *Madhura* more)
- *Aahara Shakti: Abhayavaharan Shakti: Poorwakalin: pravara, Adhayatana: avara*
- *Jarana Shakti: Poorwakalin: Pravara, Adhayatana: Avara*
- *Vyayamashakti: Poorwakalin: Pravara, Adhayatana: Avara*
- *Vaya: Madhyama* (45yrs)

Nidana:

Ahara *- Sheeta, Guru, Katu Ahara Sevana, Snighda Ahara, Anupamamsa Ati Sevana*

Vihara- *Yana, Sheeta Ritu, Avyayama, Diwaswapna*

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Manasika- *Bhaya, Shoka*

Poorvarupa: *Karapaadyoh Daha, Suptata, Mukha Talu Kantha Shosha, Pipasa, Paridaha, Nidra, Tandra.*

Rupa: *Prabhuta Mutrata*

Upashaya: *Aushada Sevana, Samvahana* to painful limbs

Samprapti Ghataka

Dosha: *Vata - Swapa, Saada, Ruk, Toda, Shosha, Spandana, Udana Vata (Bala Hani), Vyana Vata (Gati, Shoola in Hrudaya Pradesha), Apana Vata (Mutra Ati Kriya), Pitta Daha, Raga*

Dushya: *Rasa (Gaurawa, Angamarda, Ashradha, Aruchi, Aasyavairasyam,Tandra, Angamardha, Krishangata, Agninaasha), Meda - Doubarlya, Majja - Ruk Parvanaam, Bhramam, Oja - Doubarlya, VyathitaIndriya, Asthi - Asthi Soola, Purish – Vayu Agni Dharanam Cha, Mutra – Ati Mutrata, Agni - Jatharagni, Dhatwaagni - Rasa Dhatu, Agni Dusti - Mandagni, Ama: Agnimandyajanya,*

Srotas: *Udaka Vaha - Pipasa Chati Pravidham, Anna Vaha - Arochaka, Avipaka, Rasavaha Ashardha, Aruchi, Aasya Vairasyam, Tandra, Anagamardam, Krishangata, Mutra Vaha - Alpaalpaabhishknam, Sweda - Asweda, Paridaha, Paarushya.*

Srotodusti: *Sanga*

Udabhawa Sthana: *Amashaya, Pakwashaya*

Sanchar Sthana: *Basti*

Vyakta Sthana: *Hastapada, Basti*

Rogamarga: *Madhyam, Bahya*

Treatment given

- *Dashmoolaniruhakaala Basti*[8]
- *Takradhara*[9]

Internal Medication

- *Guru Rasayana (Shilajitu Loha Rasayana) 2-0-2*
- *Chandraprabhavati 1-1-1*
- *Brihat Vata Chintamani Rasa* (without gold) 1-0-1
- *Asonadiquatha* ½ glass bd. freshly prepared

Assessment

60 - second Diabetic Foot Screen.[10] Screening Tool

Screening for foot ulcers and/or limb-threatening complications. Use the highest score from left or right foot.

- Score = 0 to 6 recommend screening yearly
- Score = 7 to 12 recommend screening every 6 months
- Score = 13 to 19 recommend screening every 3 months
- Score = 20 to 25 recommend screening every 1 to 3 months

Before Treatment	After Treatment	After 2 Month Follow Up
18	12	7

Ankle Brachial Index

Before Treatment	After Treatment	After 2 Month Follow Up
Rt 0.7 Lt 0.8	Rt 1.1 Lt 0.9	Rt 1.01 Lt 1.04

Nylon monofilament test

Before Treatment	After Treatment	After 2 Month Follow Up
Rt 6 sites detected Lt 7 sites detected	Rt 10 Lt 10	Rt 10 Lt 10

Peripheral Pulsation

Before Treatment	After Treatment	After 2 Month Follow Up
Rt Feeble LT Feeble	Rt Normal Lt Normal	Rt Normal Lt Normal

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Intermittent Claudication

Before Treatment	After Treatment	After 2 Month Follow Up
Claudication Distance - 100mt	Claudication Distance - 600mt	Claudication Absent

DISCUSSION

Basti is considered to be the best treatment to normalize the *Vata Dosha*[11] which is mainly involved in this condition. With the advancement of modern science, a new nervous system of abdomen has been discovered, which is named as enteric nervous system (ENS) and is called as the mini brain. Though nothing about the relation between ENS and *Basti* therapy is known untildate, the same is supposed to work in neurodegenerative diseases like neuropathies .

Possible mode of action of *Takra Dhara*

The *Takra* (buttermilk) has hot effect. But the combination of *Amalaki, Musta* and *Takra* produces a coolant effect on the brain and the whole nervous system and hence releases the stress and anxiety stagnant in the chief controlling station of our body. As we know that the brain controls all the functions of the body. The master gland pituitary gland and the hypothalamus associated with many physical and mental functions are located in the head. When all these are relaxed, the body functions including the heart functions take place in a relaxed manner. The circulation of blood and nutrients take place in a proper way. The peripheral resistance is reduced. The channels of the body open up. The cells start flushing the toxins and overall metabolism gets improved.

Takradhara is believed to have a balancing effect on the deepest recesses of our brains, stimulating the endocrine system, the pituitary and pineal glands (for hormonal imbalances) and pleasure neurotransmitters (for depression or emotional insecurity). It is also said to enhance blood circulation to the brain, improving clarity and releasing deeply trapped *Ama*, or toxins.

CONCLUSION

This single case study patient with diabetic peripheral neuropathy and vasculopathy refractory to conventional treatment has shown significant improvement in the immediate and mid-term followup period with *Ayurvedic* treatment. The study provides early basis for larger studies regarding role of Ayurvedic treatment in management and prevention of DM related complications. All complications are preventable with good glycaemic control. The progression of most complications can be halted if detected early and appropriate therapy instituted.

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