Management of Diabetic Peripheral Neuropathy Using Ayurvedic Protocol: A Case Report

Naduvathu Vasudevan Anjaly, Mund Jaya Sankar, Mishra Ratna Prava

1 Ph.D Scholar, Mandsaur Institute of Ayurved Education and Research, Mhow-Neemuch Road, B R Nahata Marg, Opp. To Krishi Upaj Mandi, Mandsaur, Madhya Pradesh-458001, India, and Senior Medical Officer, Sreedhareeyam Ayurvedic Eye Hospital and Research Centre, Koothatukulam, Ernakulam Dist, Kerala-686662, India; 2 Ph.D, Principal, Mandsaur Institute of Ayurved Education and Research, Mhow-Neemuch Road, B R Nahata Marg, Opp. To Krishi Upaj Mandi, Mandsaur, Madhya Pradesh-458001, India; 3 Ph.D, Professor and Head, Department of Kayacetika (Internal Medicine), Mandsaur Institute of Ayurved Education and Research, Mhow-Neemuch Road, B R Nahata Marg, Opp. To Krishi Upaj Mandi, Mandsaur, Madhya Pradesh-458001, India.

Corresponding Author: Naduvathu Vasudevan Anjaly, M.D. (Ay), Ph.D Scholar, Mandsaur Institute of Ayurved Education and Research, Mhow-Neemuch Road, B R Nahata Marg, Opp. To Krishi Upaj Mandi, Mandsaur, Madhya Pradesh-458001, India; Email: dranjaly@gmail.com

ABSTRACT

Introduction: Diabetic peripheral neuropathy is the most common complication of diabetes, and can occur in all diabetics regardless of the type. Its diagnosis is clinical, with suggestive history and neurologic examination. Altering the natural history and administering symptomatic treatments are the hallmark of management, but many systems of medicine tried to target multiple pathways have not shown promising results. Hence, options in Ayurveda may be sought.

Case Report: A 49-year-old female patient who presented with numbness over her lower limbs associated with tingling sensation since the past year and who was diagnosed case of diabetic peripheral neuropathy is presented here. She underwent an inpatient treatment protocol, which included oral medicines and external therapies.

Results: Michigan Neuropathy Screening Assessment showed a 50% improvement in the history questionnaire and 80% improvement in physical examination. In the biothesiometry readings, there was an improvement in vibratory perception by 25% and 50% in right and left leg respectively.

Conclusion: This case illustrates the potential of an Ayurvedic treatment protocol to manage peripheral diabetic neuropathy.

Key Words: Ayurveda, Case Report, Diabetic neuropathy, Holistic approach, Prameha, Raktavrita vatam

INTRODUCTION

Neuropathies are common in diabetics1 and may result in serious consequences including foot ulcers, amputations, silent myocardial infarctions, and premature death.2 Diabetic peripheral neuropathy primarily involves the distal portion of the longer myelinated and un-myelinated sensory axons, with sparing of motor axons.3 Symptoms encompass numbness, tingling, burning sensation, a sensation of shooting and cutting pain, walking on cotton wool or glass shards, and feeling of either heat or cold. Conservative management in peripheral diabetic neuropathy aims at symptom relief. The efficacy of an Ayurvedic treatment protocol to manage peripheral diabetic neuropathy in a 49-year-old female with gestational diabetes is presented here. The report adheres to the Case Report (CARE) Guidelines to ensure efficacy and transparency in reporting.4 Institutional ethics committee clearance was not required; however, written informed consent was obtained from the patient before writing her case.

CASE REPORT

In 2015, the patient started experiencing occasional pricking pain in the plantar aspect of both feet. She initially ignored it, but the condition gradually worsened to the point where she started having severe burning sensations, numbness, and tingling sensations. She consulted her allopathic diabetologist for the above and he diagnosed it as Diabetic peripheral neuropathy and prescribed Remylin D tablets. She developed altered sensations in both feet four months ago. She approached Sreedhareeyam Eye Hospital for management of glaucoma, which was diagnosed three months previously, and was offered treatment for both glaucoma and peripheral diabetic neuropathy. She had developed gestational diabetes during her second pregnancy 20 years before. She has been...
using insulin for ten years (30 units in the morning and 10 in the evening). Her father is a known case of diabetes mellitus. Bowel, appetite, micturition, and sleep were normal. Cardiovascular, gastrointestinal, and central nervous systems; and all vital signs were normal.

The examination demonstrated feet devoid of deformities, dry skin, callus, infections, and fissures; absence of ulceration, decreased ankle reflexes, absent vibration perceptions at the great toes. Monofilament examination is a noninvasive examination to test the sensitivity to touch. It is measured by using a thin strand of nylon, which is applied perpendicular to skin in 10 areas of each foot. Biothesiometry, done on six specific areas of both heels, viz., big toe, anterior lateral eminences of the sole on both sides, anterior longitudinal sulcus, plantar region, and heel, demonstrated severe loss of vibratory perception, the mean being 28 volts and 34 volts in right and left foot respectively. Laboratory investigations showed an HbA1c of 6.4%, fasting blood glucose level of 174mg/dL, and post-prandial blood glucose level of 291mg/dL.

The Ayurvedic assessment demonstrated that the patient was MadhyamaVaya (middle age), Kapha-Vata Prakriti (somatic constitution of Kapha and Vata), and Madhyama (moderate) Samhanana (compactness of body parts), Pramana (measurement), Sattva (psyche), Satmya (habituation), Ahara Sakti (digestion), and Vyayama Sakti (exercise capacity). The disease was explored along the lines of Prameha Upadraya (complications of diabetes mellitus) based on her symptoms.

A COVID-19 reverse-transcription polymerase chain reaction (RTPCR) test done before IP admission turned out to be negative. Her course of inpatient Ayurvedic treatment comprised of oral medicines (Table 1) and external therapies (Table 2). Pancakarma (bio-purification) was not attempted due to the severity of the case. She was also placed on a strict dietary regime amounting to a total calorie intake of 1600 Kcal/day, which included regular mild-to-moderate exercise and intake of leafy vegetables, pulses, skimmed milk, and other healthy items; and abstinence from sweet, deep-fried, and starchy foods and products prepared from refined grains. Insulin administration as per dose and time was also adhered to.

Assessment before and after treatments was done with the Michigan Neuropathy Screening Instrument (MNSI). Biothesiometry readings, and laboratory investigations. Improvements in MNSI scores were noted. (Table 3) Biothesiometry readings improved to a stage where the moderate loss of vibratory perception was observed (20.6 and 22.5 volts in right and left foot respectively). (Table 4) FBS taken on October 13th, 2020 showed improvement to 144mg/dL. FBS and PPBS taken on 25th October, 2020 improved to 140mg/dL and 207mg/dL respectively.

Diabetic Powder* (2 tablespoons boiled in 1L of water and taken intermittently after filtering), PrabhanjanaVimardana-Tailesand Sahacaradi Taila (application 1/2 hour before bath), Varanadi Kvatha and Indukanta Kvatha (10mL of each decoction boiled in 45mL boiled and cooled water and taken twice a day before food), Dhvanvantara Gutiya (1 tablet powdered and added to the decoctions), and Varachuruna (1 teaspoon of powder with hot water 1/2 hour after dinner) were prescribed at discharge, along with instructions to adhere to a strict diabetic diet and perform regular mild-to-moderate exercise daily.

All medicines were manufactured at Sreedhareeyam Farm-herbs India, Pvt. Ltd., the hospital’s GMP-certified manufacturing unit.

**DISCUSSION**

Diabetes mellitus is considered as Prameha as per Ayurveda, and is placed among the eight dreadful conditions (Ashta Mahagada), viz., Vatavyadhi (neurological diseases), Asmari (renal calculus), Kushtha (obstinate skin disorders), Meha (obstinate urinary disorders including diabetes mellitus), Udara (abdominal enlargement), Bhagandara (fistula-in-ano), Arsas (haemorrhoids), and Grahan (irritable bowel). All varieties of Meha, if untreated, progress to Madhumeha, which is Asadhyasa (incurable).

The probable Nidanas observed in this patient were overindulgence in foods that were Guru (heavy), Snigdha (unctuous), Sita (cold), and Picchila (slimy) by nature. These resulted in Dhatvagnimandya (impaired digestion at the level of the tissues), which in turn lead to the production of Ama (undigested, toxic waste). The weakened Agni was not able to produce proper Anna Rasa (the essence of food). Dhatvagnimandya of Medas (adipose tissue) failed nourishment of the other Dhatu, viz., Asthi (bone), Majja (marrow), and Sukra (seminal fluid), resulting in their Kshaya (decrease). This Kshaya was manifested in the form of neuropathy and other consequences of diabetes mellitus.

The Rukshata (dryness) in the patient’s body as a result of increased Vata caused a failed vasodilator mechanism that altered the functions of endoneural and epineural blood vessels. Sensory disturbances in this patient were caused by affected Rakta Dhatu (blood tissue). It also resulted in Dhamani Praticaya (hardening of vessels), a Nanatmaja Vikara of Kapha, as evidenced by microangiopathy.

Pricking pain in this patient was significant of Sucithhiriva Tudyate (feeling of pins and needles), which is a Lakshana of Sonitavrita Vata described by Acarya Susruta and Majjavrita Vata described by Acarya Caraka. Tingling sensation is indicative of Cumcumayana, a feature of Sonitavrita Vata told by Acarya Susruta; Harsha Lomaharsha, a feature of Tvaggatha Vata as per Susruta and Pittavrita Samana Vata told by Caraka. The burning sensation is indicative of Daha, a Purvarupaand Upadraya of Prameha told in Caraka Samhita Nidana.
were (unctuous), and to nourish the nerves. The common (slimy) qualities were avoided as the,

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Sthana; Vidaha, a

Sthana; and Bheda, a NanatmajaVikaraof Vata.

Based on the above, the treatment protocol was adopted to reduce Prameha and to nourish the nerves. The common properties of the oral medications are Kapha-Vata Samana (pacifying Kaptha and Vata), Dipana (appetizing), Pacana (digestive), Srotosodhana(channel-cleansing), and Lekhana (scarifying). Excess Snigdha(unctuous), Manda (slow), and Picchila(slimy) qualities were avoided as the Kapha DoSHA was pathologically active. The medicines possess antioxidants, antibacterial, and anti-diabetic properties, which helped to re-establish homeostasis and metabolism, and supply nutrition to the nerves.

The external therapies were aimed at normalizing Vata. Patra Pinda Sveda enhanced vasodilation and promote the activity of the parasympathetic nervous system by its Ushna (hot) property. The Sukshma (minute) and Sara (fluid) properties enabled dislodging of the adherent Doshas and expelling through the pores of the skin as sweat. The use of Saindhavand Jambiravarsa enhanced its absorption into the skin and propelled it to dislodge adherent Doshas. Abhyanga further enhanced vasodilation and transport of nutrients by its application of pressure and motion. The medicines used for Abhyangware Vataharaby nature. Sashthika Sali Pinda Sveda not only stimulated Vata but also nourished the nervous system. The combined effects of the external therapies enhanced nervous activity, stimulated the peripheral nervous system, and enhanced sensitivity, as documented in the biothesiometry readings.

The strict dietary regime was to lower serum glucose, minimize carbohydrates, and restore metabolism. Equal and spaced portions from each of the main food groups were essential to balance the amounts of carbohydrates, vitamins, minerals, and nutrients.

CONCLUSION

A concerted effort by the oral medicines, external therapies, and dietary regime yielded positive results in the patient. At the time of discharge, biothesiometry readings improved and the MNIS showed more positive results. Management of Meha may always be a challenge, but concerted efforts by the physician, medicine, attendants, and physicians, the four limbs of treatment, result in positive outcomes. The results obtained in this report may be analyzed and validated by large-scale sample trials.

ACKNOWLEDGEMENT

The authors thank Sreedhareeyam Ayurvedic Eye Hospital and Research Center, and Sreedhareeyam Farmherbs India Pvt. Ltd., for their help in preparing this case report. The authors acknowledge the immense help received from the scholars whose articles are cited and included in references to this manuscript. The authors are also grateful to the authors/editors/publishers of all those articles, journals, and books from where the literature for this article has been reviewed and discussed.

Source of Funding:

No financial interests (stocks, patents, employment, honoraria, or royalties) or nonfinancial relationships (political, personal, or professional) that may be interpreted as influential toward the content of this manuscript are declared as well.

Conflict of Interest: None declared.

Authors’ Contribution:

- Anjaly Naduvathu Vasudevan collected and analyzed the data and prepared the report.
- Jaya Sankar Mundanalyzed the data and reviewed the article.
- Ratna Prava Misraanalyzed the data and reviewed the article.

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Annexure: The Michigan Neuropathy Screening Instrument

**Part A: History (to be completed by the patient of diabetes)**

Please take a few minutes to answer the following questions about the feeling in your legs and feet. Check ‘yes’ or ‘no’ based on how you feel. Thank you.

| No. | Question                                                                 | Yes | No |
|-----|--------------------------------------------------------------------------|-----|----|
| 1   | Are your legs and/or feet numb?                                          |     |    |
| 2   | Do you ever have any burning pain in your legs and/or feet?             |     |    |
| 3   | Are your feet too sensitive to touch?                                   |     |    |
| 4   | Do you get muscle cramps in your legs and/or feet?                      |     |    |
| 5   | Do you ever have any prickling feelings in your legs or feet?           |     |    |
| 6   | Does it hurt when the bed covers touch yours kin?                       |     |    |
| 7   | When you get into the tub or shower, are you able to tell the hot water from the cold water? | | |
| 8   | Have you ever had an open sore on your foot?                            |     |    |
| 9   | Has your doctor ever told you that you have diabetic neuropathy?        |     |    |
| 10  | Do you feel weak all over most of the time?                             |     |    |
| 11  | Are your symptoms worse at night?                                       |     |    |
| 12  | Do your legs hurt when you walk?                                        |     |    |
| 13  | Are you able to sense your feet when you walk?                          |     |    |
| 14  | Is the skin on your feet so dry that it cracks open?                    |     |    |
| 15  | Have you ever had an amputation?                                        |     |    |

Total _______________

**Part B: Physical Assessment (To be completed by a health professional)**

1. Appearance of Feet

   - Right
     - Normal: [ ] Yes [ ] No
     - If no, check all that apply:
       - Deformities
       - Dry skin, callus
       - Infection
       - Fissure
       - Other
       - Specify: ______________________

   - Left
     - Normal: [ ] Yes [ ] No
     - If no, check all that apply:
       - Deformities
       - Dry skin, callus
       - Infection
       - Fissure
       - Other
       - Specify: ______________________

2. Ulceration

   - Absent [ ] Present [ ]

3. Ankle Reflexes

   - Present [ ] Present/Reinforcement [ ] Absent [ ]

4. Vibration

   - Perception at great toe
     - Present [ ] Decreased [ ] Absent [ ]

5. Monofilament

   - Normal [ ] Reduced [ ] Absent [ ]

Total Score: __________/10 Points
Table 1: Oral Medicines

| Medicine                  | Dosage | Anupana    | Time    | Duration           |
|---------------------------|--------|------------|---------|--------------------|
| Diabetic Water*           | 40mL   | -          | As and when required |                     |
| Varanadi Kvatha           | 40mL   | Sukhoshna Jala | Morning |                     |
| KancanaraGuggulu          | 1 tablet| Varanadi Kvatha | Morning |                     |
| Dhanvantara Gutika        | 1 tablet| SukumaraKvatha, Punarnavadi Kvatha | Evening | 06/10/2020 - 28/10/2020 |
| KasturyadiGutika          | 60mL   | Sukhoshna Jala | Morning |                     |
| SukumaraKvatha            | 1 tablet| Varanadi Kvatha | Morning |                     |
| Punarnavadi Kvatha        | 15mL   | Sukhoshna Jala | Morning | 16/10/2020 - 28/10/2020 |

Table 2: External Therapies for the Case of Diabetic Peripheral Neuropathy

| Therapy                  | Medicine                                | Procedure                                                                                              | Time    | Duration           |
|--------------------------|-----------------------------------------|--------------------------------------------------------------------------------------------------------|---------|--------------------|
| Patra Pinda Sveda        | Sigrupatrafoor Pinda; Karpuradi, Cincadi Taila for Abhyanga | Two boluses were prepared with leaves of Moringa oleifera Lam., and were applied over the body.          | Morning | 08/10/2020 - 13/10/2020 |
| Abhyanga                 | Cincadi Taila, Narayana Taila           | The lukewarm oil was massaged over the body.                                                            | Morning | 16/10/2020 - 19/10/2020 |
| Sashtika Sali Pinda Sveda| -                                       | Bala Mula Kvatha and Ksheera were boiled and Sashtika was added to this. The resultant mixture was placed in cloth and formed into a bolus, which was then applied over the body. | Morning | 20/10/2020          |

Table 3: Michigan Neuropathy Screening Instrument

| Parameter                              | Right Leg | Left Leg | Scoring Criteria                                                                 |
|----------------------------------------|-----------|----------|----------------------------------------------------------------------------------|
|                                        | BT        | AT       |                                                                                  |
|                                        | AT        | BT       | AT                                                                               |
| History                                | 8         | 4        | Yes; 1; No: 0 (Questions 1-3, 5, 6, 8, 9, 11-15)                                  |
|                                        | 8         | 4        | Yes: 0; No: 1 (Questions 4, 7, 10)                                               |
| Appearance of the Feet                 | 0         | 0        | 0: Absent; 1: Present                                                            |
| Ulceration                             | 0         | 0        | 0: Absent; 1: Present                                                            |
| Ankle Reflexes                         | 0.5       | 0.5      | 0: Present; 0.5: Decreased; 1: Absent                                           |
| Vibration Perception at the Great Toe  | 1         | 0        | 0: Present; 0.5: Decreased; 1: Absent                                           |
| Mono-filament                          | 6/10      | 8/10     | 5/10                               | 0.5 | 0: Present; 0.5: Decreased; 1: Absent |

BT: before treatment; AT: after treatment

Table 4: Biothesiometry Readings

| Examination Areas                          | Right Heel |          | Left Heel |          |
|--------------------------------------------|------------|----------|-----------|----------|
|                                            | BT         | AT       | BT        | AT       |
| Big toe                                    | 40         | 36       | 29        | 28       |
| The anterior lateral eminence of the sole  | 31         | 21       | 40        | 13       |
|                                            | 24         | 11       | 40        | 28       |
| Anterior longitudinal sulcus               | 24         | 20       | 39        | 24       |
| Planter region                             | 22         | 17       | 26        | 25       |
| Heel                                       | 30         | 19       | 32        | 17       |
| Total average reading                      | 28         | 20.6     | 34        | 22.5     |

BT: before treatment; AT: after treatment