ABSTRACT

Background: As the civilization improved, diseases also evolved as a negative effect of development. Among them diabetes mellitus is one and prime. Principally diabetes mellitus is a metabolic disorder with variable clinical manifestations and progression. The longstanding hyperglycemia adversely affects multiple organ systems especially kidney, eyes and sensory nerves. Diabetic Sensory Neuropathy leads to burning sensation in soles of feet and Paraesthesiae. Diabetic Neuropathy is considered as Upadrava of Madhumeha and is analyzed under vikar-prakruti, samuthan vishesha and adhisthan. In conventional medicine, medicines used for diabetic sensory neuropathy are for symptomatic relief. All these drugs have their side effects. Hence there is need to find out safer and effective treatment from the sources other than conventional medicine. Hence the management of DSN through Ayurvedic medications and procedures is most needed currently. Aim and Objective: To compare and evaluate the efficacy of Dhanyamla Dhara and Dashmoola Kashaya Dhara in Diabetic Sensory Neuropathy in detail. Methodology: For these 40 patients were selected dividing 20 in each group. Group A treated with Dhanyamla Dhara and Group B treated with Dashmoola Kashaya Dhara for 21 days. Results and Conclusion: Dhanyamla Dhara and Dashmoola Kashaya Dhara showed good results in their respective Kalpas but when we compare with each other both groups showed statistically not significant results on parameters of the study. But Clinically Dhanyamla Dhara shown more efficacy than Dashmoola Kashaya Dhara.

Keywords: Karpada Daha, Dourbalya, Suptata, Haritkyadi Yoga, Dhanyamla Dhara, Dashmoola Kashaya, Gandharvahastadi Kashaya.

INTRODUCTION
Diabetes mellitus is caused by a spectrum of diverse etiologies resulting in chronic hyperglycemia and complications related to it. The earlier diagnosed the better complications prevented. Due to chronic nature of the disease, diabetics have to maintain a healthy lifestyle that includes lifestyle modification and healthy eating, keeping a control on amount of calories intake, depending on the type of diabetes a person is suffering with; principally diabetes mellitus is a metabolic disorder with variable clinical manifestations and progression. The longstanding hyperglycemia adversely affects multiple organ systems as heart, kidney, eyes and sensory nerves. Diabetic sensory neuropathy leads to burning sensation in soles of feet and paraesthesiae. The loss of sensation in feet’s plays an important cause for the development of pressure sores which does not heal and ultimately terminating into diabetic gangrene. The development of gangrene forces the doctor to take drastic lifesaving steps as amputation, which makes the patient permanently immobile. Hence in diabetics, prevention and management of sensory neuropathy is of utmost importance. Dhanyamla Dhara and Dashmoola Kashaya Dhara were used, which are considered as best Vatakaphashamaka, Sothahara, Shoolahara and Balya properties also will be effective in reducing major symptoms of Diabetic Neuropathy. Hence, these drugs are selected for the study to know their efficacy when used as DHARA in the Signs and Symptoms of Diabetic Sensory Neuropathy.

Materials and Methods:

Harikyadi Yoga for Amapachana in both groups.

**Ingredients:**
- Haritaki – 1 part; Amalki – 1 part; Vacha– 1 part; Vidanga– 1 part; Haridra – 1 part; Shunthi – 1 part; Pippali – 1 part; Guda – 1 part; Lavana – 1 part

**Method of Preparation:**

All the drugs were taken in completely dry form. Each drug was separately pounded and sieved (except guda); later the Churnas were mixed thoroughly in the equal quantity with guda and stored in airtight containers.

**Dose** – 5gm twice a day, **Anupana** – Ushnodaka, **Time of Administration** – Before Food

**Group A: Dhanyamla (Chiktsa Manjari, Vaata Vyadhii):**

A total 360 liters of Dhanyamla was prepared in 3 batches at the department of Rasashastra and Bhaishajya Kalpana, A.M.V. Hubli.

**Ingredients of Dhanyamla:**
1. **Tandula** – 10 prastha quantity (7680 grams)
2. **Pruthuka** – 10 prastha quantity (7680 grams)
3. **Laja** – 40 pala quantity (1920 grams)
4. **Kulattha** – 40 pala quantity (1920 grams)
5. **Kangubeeja** – 01 adhaka quantity (3072 grams)
6. **Kodrava** – 04 prastha quantity (3072 grams)
7. **Nagara** – 2 prastha quantity (1536 grams)
8. **Nimbuka** – 2 adhaka quantity (6144 grams)
9. **Deepyaka** – Carom seeds – 8 kudava quantity (1536 grams)
10. **Jala** – 200 prastha (153.6 liters)

**Method of Preparation:**

A large deep vessel was placed on fire followed by pouring of 200 prasthas of water for boiling. Two potlis was prepared for convenience containing all drugs in appropriate quantity. Then these potlis were hanged in vessel containing water with a rod placed over the vessel. Then pot was covered with a lid and was heated gently on a moderate fire for a period of 7 days. The vessel was fumigated with guggulu etc. and proper preservation was done to make it devoid of microorganisms. The temperature was not let to rised above the boiling point. Heating was continued for the next 7 days. From the 8th day onwards this liquid was used for dhara and the same quantity of boiled water was added into the vessel.

**Duration:** 21 days

**Usage:** Sarvanga Dhara in Diabetic Sensory Neuropathy.

**Group B: Dashmoola Kashaya Dhara:**

**Ingredients:**
- Bilva 1 Part; Agnimantha 1 Part; Shyonak 1 Part; Patala 1 Part; Gambhari 1 Part
Laghu Panchamoola: Shalaparni 1 Part, Prishniparni 1 Part, Brihati 1 Part, Kantakari 1 Part, Gokshur 1 Part.

Method of Preparation: 1 part of Dashmoola Kashaya churna and 8 part of water was taken in vessel and boiled until it reaches 1/4th of its part. Then it was filtered.

Duration: 21 days.
Usage: For Sarvanga Dhara.

Gandharva Hastadi Kashaya:
The kashayam was prepared by following herbs in equal parts. Gandharvahasta, Chirabilva, Hutasha, Vishwa, Pathya, Punarnava, Yavasa, Bhumitaala

- Duration: 21 days.
- Dose: 20-40 ml at bedtime.
- Usage: For Nitya Virechana in both groups.

a) Source of data:
In this study the subjects attending the O.P.D & I.P.D of Department of Post-Graduate studies in Panchakarma, Ayurveda Mahavidyalaya and Hospital, Hubli.

b) Diagnostic Criteria:
A. Subjective Parameters:
1. History of Diabetes with any of the following signs and symptoms.
   a. Burning Sensation (Karapada Daha) in Hands & legs.
   b. Muscle weakness (Dourbalya) in Hands & legs.
   c. Sensory loss (Suptata) in Hands & legs.
   d. Symptoms worsens at night.

2. Physical examination:
   a. Muscle strength and Reflexes.

B. Objective Parameters:
1. Vibration Test, Pin Prick,
2. Temperature Discrimination.
3. Hematological Examination including R/E, FBS, PPBS, LFT, RFT.
4. Electrophysiological Study (Nerve Conduction Study will be done to assess the condition of Nerves and to differentiate Axonal degeneration or demyelination type of Neuropathy. Test will be done BT and AT.
5. ‘Glove – and – Stocking’ impairment.

c) Inclusion criteria:
1. Subjects with either sex of age group between 30 to 50 years.
2. Subjects with clinical evidence of distal symmetrical Diabetic Polyneuropathy.
3. Subjects of controlled blood Sugar level with conventional medications.

d) Exclusion Criteria:
1. Patients with other metabolic and endocrine diseases.
2. Patients with autonomic, proximal and focal neuropathic state.
3. Patient suffering from infectious diseases.
4. Patients with wound/ulcer.
5. Patients with other complications like Diabetic Nephropathy, Diabetic Ketoacidosis and Diabetic Coma. Alcoholic Neuropathy/Drug Induced Neuropathy.

e) Study Design: - It is a randomized single blind comparative study with pre-test and post-test design.
f) Sample Size: - Totally 40 patients were selected to clinical trials. Patients were assigned into two groups.

1) Group A: In this group, 20 patients were treated with Dhanyamla Dhara.
2) Group B: In this group, 20 patients were treated with Dashmoola Kashaya Dhara.

h) Duration of treatment: For 21 days.
i) Parihara Kala: 42 days.
j) Follow Up: 3 months.
k) Statistical Analysis:
The analysis of the effects of therapy was based on “t-test” applications.

Observations:
1. Out of 40 patients, maximum 40 patients (100%) had Karapada Daha and Symptoms worsens at Night, 38 patients (95.00%) had Suptata and 15 patients (37.50%) had Dourbalya.
2. Out of 40 patients, maximum 20 patients (50%) had Reduced Reflexes and 15 patients (37.50%) had Reduced Muscle Strength.
3. Out of 40 patients, maximum of 35 patients (87.5%) had Light Touch Loss, Temperature
sensation Loss, Vibration Loss, Position Change Loss and Pain Sensation Loss.

4. Out of 40 patients, maximum of 32 patients (80.00%) had Neuropathy, 08 patients (20.00%) had Mild-Neuropathy.

5. Out of 40 patients, maximum of 40 patients (100%) had Stocking Impairment, 11 patients (47.5%) had Glove and Stocking Impairment.

Results:

Table 1:

<table>
<thead>
<tr>
<th>Subjective Parameters</th>
<th>Percentage of Relief</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Group A</td>
</tr>
<tr>
<td>Karapada Daha</td>
<td>75.00</td>
</tr>
<tr>
<td>Dourbalya</td>
<td>78.57</td>
</tr>
<tr>
<td>Suptata</td>
<td>76.00</td>
</tr>
<tr>
<td>Symptoms Worsens at Night</td>
<td>85.71</td>
</tr>
</tbody>
</table>

Table 2:

<table>
<thead>
<tr>
<th>Objective Parameters</th>
<th>Percentage of Relief</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Group A</td>
</tr>
<tr>
<td>Muscle Strength</td>
<td>70.00</td>
</tr>
<tr>
<td>Reflexes</td>
<td>70.00</td>
</tr>
<tr>
<td>Light Touch</td>
<td>75.86</td>
</tr>
<tr>
<td>Temperature</td>
<td>78.26</td>
</tr>
<tr>
<td>Vibration</td>
<td>63.16</td>
</tr>
<tr>
<td>Position Change</td>
<td>75.00</td>
</tr>
<tr>
<td>Pain</td>
<td>76.00</td>
</tr>
<tr>
<td>NCS</td>
<td>17.14</td>
</tr>
<tr>
<td>Stocking</td>
<td>75.00</td>
</tr>
<tr>
<td>Glove and Stocking</td>
<td>70.00</td>
</tr>
</tbody>
</table>

The therapy under Group A provided Marked Improvement for 13 subjects and Moderate improvement for 07 subjects. The therapy under Group B provided Marked Improvement for 09 subjects, Moderate improvement for 08 subjects and Mild Improvement for 03 subjects.

**DISCUSSION**

1. DSN is upadrava of Madhumeha, which is one type of vataja prameha. So, the main involved dosha in this condition is Vata dosha along with Pitta and Kapha. In Ayurveda lakshanas like Pada suptata, Padaharsha are dealt under vatavyadhis. And Daha is explained as a separate disease under Pitta Vyadhi. In which one type of daha is Dhatukshayaj Daha, which is due to avarana of Vata; same daha is seen in DSN.

2. Main involvement in the pathophysiology of DSN is due to tridoshas mainly Vata and Kapha; as the symptoms like Karapada Daha which may be due to prakupita vata along with pitta, Karpada Suptata due to prakupita vata and kapha, Dourbalya may be due to prakupit Vata.

3. As main vitiated doshas are vata and Kapha and Dhanyamla and Dashmoola both possess Vata hara and Kapha hara properties. So, this might be the reason for decrease in the Signs and Symptoms and providing relief to the patients of DSN.
Discussion on Probable mode of action of Dhanyamla Dhara:

- **Amla rasa** – According to Ayurveda kindles the agni and acts as deepana and gets rid of ama (endotoxins formed due to errors of metabolism) and acts as pachana. Since many diseases are manifested because of bad metabolism, Dhanyamla dhara de-roots these diseases from base. Thus, Dhanyamla dhara forms the first line of treatment in many systemic disorders having their origin from weak digestion or errors of metabolism.

- Apart from this, Amla Rasa is Hridya, Rochana, Laghu and Snigdha. The digestive power of agni or core fire in the body will get enhanced due to the impact of Laghu and Teekshna Guna’s of Dhanyamla.

- Due to its Ushna Guna and Ushna Veerya, Dhanyamla destroys the vitiated Vata or Kapha or Vata-Kapha. The same properties make Dhanyamla antagonistic to ama and Meda.

- With the help of these properties Dhanyamla removes the blocks in the cells and channels of transportation and nutrition. The cells will start getting proper nutrition and building elements, which in turn enhances the strength and immunity of the body. Dhanyamla is thus highly effective in ama disorders, Vata disorders, Kapha disorders and Vata-Kaphaja Disorders.

- Owing to its properties of Vatanulomana, Shula prashamana, Nadi uttejaka, Vedana shhapana, Dhanyamla effectively combats Vata and Vata disorders.

Discussion on Probable Mode of Action on Dashmoola Kashaya Dhara

1. **Increases metabolic rate**: By Swedana process, our body temperature is increased and due to increase in body temperature, sympathetic activities are also increased. Because of increased Sympathetic activities hormones like Epinephrine, Norepinephrine, Cortisol, Thyroid Hormones are released which accelerate the metabolic rate and stimulate the process of lipolysis. As a result of increased metabolism there is increased demand for oxygen and increased output of waste products. It can be correlated with digestion of Ama.

2. **Vasodilatation**: If the body temperature rises a negative feedback action becomes active to reach at normal temperature. Higher temperature of the blood stimulates thermo receptors that send nerve impulses to the preoptic area of the brain. Which in turn stimulate the heat losing center and inhibit the heat promoting center. Nerve impulses from the heat losing center cause dilation of blood vessels in the skin so the excess heat is lost.

3. **Stimulation of Sweat Glands**: A high temperature of blood stimulates sweat glands of the skin via hypothermic activation of sympathetic nerves and by this procedure excessive sweat production takes place. With the increased Sweat production more waste products are expelled Out of the body through the medium of sweat. Hence, it can be said that Swedana corrects Swedavah-Srto-dushti.

**CONCLUSION**

The Symptoms mentioned in our Classical texts as mentioned under Upadrava of Prameha such as pada datha, pada suptata, and Dourbalaya are like Diabetic Sensory Neuropathy Signs and Symptoms. Diabetic Sensory Neuropathy can be treated as Upadrava of Prameha as explained in our Classics. The pathology behind the Neuropathy is damage of the blood vessels supplying nerve fibres secondary to the presence of excessive amount of glucose. This patho-physiology of the diabetic peripheral neuropathy is collectively called as microangiopathy. The poor or no supply of nutrients to the nerve fibres by blood vessels causes the damage to the nerve anatomy and physiology and tends to cause pathology showing symptoms as burning, tingling, pricking, numbness and loss of sensation of touch etc. By this we can conclude that this may be due to avarana of Vata by kapha and pitta. Dhanyamla which is rich in phyto-chemicals like flavonoids and tannins which promote healing process by increasing formation of capillaries and hence it can be concluded that it can be helpful in providing nutrients to nerve fibers and can be helpful in treating Signs and symptoms Diabetic Sensory Neuropathy.
Neuropathy. Antioxidant and anti-toxic actions of *Dhanyamla* will help in reducing the progression of Diabetic Sensory Neuropathy. *Dashmoola Kashaya* when poured over body stimulates metabolism, Vasodilation and Sweat glands which ultimately have an impact on Nervous System and Endocrine System and hence it will help in treating Diabetic Sensory Neuropathy. *Dashmoola Kashaya* being *Tridoshahara* mainly *Vata* and *Kapha* have major role to subside the signs and symptoms of Diabetic Sensory Neuropathy. But if we see the difference in average percentage of relief i.e. (7.42) between *Dhanyamla Dhara* and *Dashmoola Kashaya Dhara*; another conclusion can be drawn as *Parisheka Sweda* with *Vata Kapha Shamak* drugs are effective in Degenerative Disorders like Diabetic Sensory Neuropathy. So, from this it can be concluded that *Sarvanga Dhara* for longer duration i.e. 28 days can give more effective results.

**Recommendations for the further study:**

1. As the study was done on small sample size however for more accurate result, large sample study for longer period may be conducted.
2. Studies to describe the effect of *Sarvanga Dhara* on regeneration of Myelin Sheath with modern techniques.

**REFERENCES**

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**Source of Support: Nil**

**Conflict of Interest: None Declared**

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