A SINGLE CASE STUDY ON THE MANAGEMENT OF DIABETIC POLYNEUROPATHY WITH MOKSHAYAN

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ABSTRACT
Diabetic Polyneuropathy is one among the lifestyle disorders. An integrated approach should be done for analysis of a disease specially when no direct references are found for Diabetic Polyneuropathy. The living body perceives stimulus, responds to it through the medium of *Vata*. *Vata* is the sole factor for health in its equilibrium (*Prakriti*), at its own abode (*Sthanastha*) and unimpeded mobility (*Avyahata gati*). The later being the most important since *gati* is the peculiar feature mostly related with neurological function. Coming to the sensory functions, *Sparsha* or tactile perception is the quality of *vayu mahabhuta*, by means of which the individual can sense the condition of environment in which he is living. The *twakindriya* itself is composed of *akasha* and *vayu mahabhuta* composition and *ashrayee* for *Vata*. So the need for management of diabetic polyneuropathy led to the trial of Mokshayan.

INTRODUCTION
The concept of the *Samprapti* of a disease is a result of a diligent observation of its signs and symptoms and their in-depth analysis. Charting a course of treatment for such diseases would bear fruit only if the signs and symptoms of diseases are observed in terms of Ayurveda symptomatology followed by the construction of a supporting base of knowledge regarding its etiology and pathology, all of which without deviating from the acknowledged principles of Ayurveda.

*Vata* is *asamghata* (incorporeal) and *anavasthita* (unstable) and hence *anasadhya* (inaccessible). Due to this the physical aspects *Vata*, it is difficult to perceive but its functions can be inferred, from these functions, the properties (*gunas*) are known. Eventhough *Vata* is *avyakta*, its *karmas* are *vyakta*. *Vata* is *sookshma*, *svayambhoo*, and *sarvagata*. These qualities of *Vata* can be compared with that of a nerve impulse. A nerve impulse is self originated, propagated, reaches all the way through, it is subtle and it is assessed by the functions like movement, secretions etc. *Vata* is responsible for all *chestas*, *indriyapraavrititis*-especially the sense of touch. *Vata* is its normal state governs the enthusiasm, respiration, motor activities, reflex activities, regulation of circulation and all functions of sense organs.

From the above description it is clear that the living body perceives stimulus, responds to it through the medium of *Vata*. *Vata* is the sole factor for health in its equilibrium (*Prakriti*), at its own abode (*Sthanastha*) and unimpeded mobility (*Avyahata gati*). The later being the most important since *gati* is the peculiar feature mostly related with neurological function. Coming to the sensory functions, *Sparsha* or tactile perception is the quality of *vayu mahabhuta*, by means of which the individual can sense the condition of environment in which he is living. The *twakindriya* itself is composed of *akasha* and *vayu mahabhuta* composition and *ashrayee* for *Vata*. The body and mind is the *adhishthana* of *vedana* and this *vedana* is perceived by whole body except *kesha*, *joma*, *nakha*, *anna*, *mala*, *moorta* and *shabdadi gunas*. *Ganghadhara*, while commenting on *vedanasthapana gana* mentions that *vedana* is *samjna* (sensation) - nothing but sensation of touch. *Chakrapani*, while commenting on “*Abhirodha*” clarifies that *Vata* is the receptor for all *indriyarthas*. The *Sparsanendriya* is *Vayumaya* and all pervasive in the body. The properties of other *mahabhutas* like *kharas*, *drava*, *chala* and *usmana* are to be known by touch. This can be interpreted as sensory modalities like hot / cold sensations, position sense, vibration sense etc. The five *karmendriyas* which performs motor activities are also under control of *Vata*. Hence, it can be summarized that *Vata* is the prime factor causing health and disease. *Vata* is responsible for the normal functioning of all *Indriyas*.

It can be seen that all these functions are impaired in a neuropathy patient. According to *Charaka* it is the *Ojas*, which is situated in the *hridaya* is responsible for the *Sparsha jnana*. *Chakrapani* further clarifies it as perception of all sensation from external environment through *Sharira-Indriya-Satva-Atma samyoga*.
(physiology of perception of touch)\textsuperscript{[11]} This supports Sushruta’s view of sparsa ajñana as a function of rakta which is situated at hridaya. Hence, sensory perception is function of Vata along with Rasa and Rakta, all being sarvadehaga.

**CASE REPORT**

A 42 year old male diagnosed of type 2 diabetes came with complaints of Pain, numbness, tingling sensation on his both legs and generalised weakness. Patient was on metformin 500mg twice a day before meal with water. There were no associated complaints like itching.

There was no any past history of injury, wound, in contact to any chemical or harmful dietary substance.

**EXAMINATION**

Vitals were normal with adequate diet. Local & systemic examination reveals no any abnormality. Bowel habits were normal. Micturation was 5-6 times in a day & 2 times at night. No any colour changes or other deformity was found in both legs.

**EVALUATION OF SYMPTOMS**

Evaluation of neuropathy are based on the following criteria-

ACTG PERIPHERAL NEUROPATHY SCREENING TOOL\textsuperscript{[12]}

<table>
<thead>
<tr>
<th>Mild to severe</th>
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<tbody>
<tr>
<td>01</td>
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<table>
<thead>
<tr>
<th>1. Symptoms</th>
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<tbody>
<tr>
<td>a. Pain, aching, or burning in feet, legs ................................................. BT AT</td>
</tr>
<tr>
<td>b. &quot;Pins and needles&quot; in feet, legs ......................................................... BT AT</td>
</tr>
<tr>
<td>c. Numbness (lack of feeling) in feet, legs ................................................ BT AT</td>
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</tbody>
</table>

<table>
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<tr>
<th>2. Location of symptoms</th>
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</thead>
<tbody>
<tr>
<td>Use Score of:</td>
</tr>
<tr>
<td>0 = None</td>
</tr>
<tr>
<td>1 = feet only</td>
</tr>
<tr>
<td>2 = extends to ankles</td>
</tr>
<tr>
<td>3 = extends above ankle but not to knee 4 = extends to knees</td>
</tr>
<tr>
<td>5 = extends above knees</td>
</tr>
</tbody>
</table>

a. Pain, aching, or burning in feet, legs ................................................. BT AT |
| b. "Pins and needles" in feet, legs ......................................................... BT AT |
| c. Numbness (lack of feeling) in feet, legs ............................................. BT AT |

<table>
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<tr>
<th>3. Vibration Perception</th>
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<tbody>
<tr>
<td>a. Great toe DIP joint perception of vibration in seconds</td>
</tr>
<tr>
<td>b. Vibration perception score</td>
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</table>

Vibration Perception

0 = felt > 10 seconds
1 = felt 6-10 seconds
2 = felt < 5 seconds 3 = not felt

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<tr>
<th>4. Ankle reflexes</th>
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</thead>
<tbody>
<tr>
<td>0 = absent</td>
</tr>
<tr>
<td>1 = Hypoactive</td>
</tr>
<tr>
<td>2 = Normal deep tendon reflexes 3 = Hyperactive</td>
</tr>
<tr>
<td>4= Clonus</td>
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<tr>
<td>8 = unable/did not assess</td>
</tr>
</tbody>
</table>

Ankle reflex
Samprapti Ghataka

Dosha: Tridoshas; Vata pradhana
Dushya: Rasa, Rakta, Mansa, Medas, Asthi, Majja, Shukra and Ojas, Upadhatu: Twacha: sira, kandara and snayu in later stages.
Agni: Jatharagni and dhatagni mandya
Ama: Tajaniya
Srotas: Annava, Udakavaha, Rasavaha, Raktavaha, Mamsavaha, Medovaha, Majjavaha, Shukravaha, Swedavaha, Mootravaha, Parishavaha and Samjnavaha Srotas.
Srotodushti Prakara: Sanga, Vimarga gamana
Udabhavasthana: Amapakwashaya
Sancharasthan: Rasayani
Vyakrsthan: Shakha especially adhashakha
Adhishthana: Shareera
Rogamarga: Bahya
Vyadhi Swarupa: Chirakari

Medication: 10 ml mokshayan on every 3rd day for 30 days

Mokshayan- Contents

<table>
<thead>
<tr>
<th>Ayurvedic name</th>
<th>Botanical name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Haridra</td>
<td>Curcuma Longa</td>
</tr>
<tr>
<td>Punarnava</td>
<td>Boerhaavia Diffusa</td>
</tr>
<tr>
<td>Bilva</td>
<td>Aegle Marmelos</td>
</tr>
<tr>
<td>Lodhra</td>
<td>Symlocos Racemosa</td>
</tr>
<tr>
<td>Vacha</td>
<td>Acorus Calamus</td>
</tr>
<tr>
<td>Tulsi</td>
<td>Ocimum Sanctum L</td>
</tr>
<tr>
<td>Brahmi</td>
<td>Bacopa Monnieri</td>
</tr>
</tbody>
</table>
Haridra\textsuperscript{[13]}

Punarnava\textsuperscript{[14]}
Immunomodulatory effects, Immunosuppressive activity, Antidiabetic activity, Anti- metastatic activity, Antioxidant activity, Antiproliferative and Antiestrogenic activity, Analgesic and Anti-inflammatory activity, Antilymphoproliferative Activity, Anti-viral activity, Hepatoprotective Activity, Antibacterial Activity, Antistress & adaptogenic Activity, Nitric Oxide Scavenging Activity, Adaptogen Activity, Growth Inhibition of Struvite Crystals, Anti fibrinolytic activity, Chemopreventive action

Bilva\textsuperscript{[15]}

Amalaki
Cytoprotective, immunomodulatory, prevent hepat and renal toxicity of heavy metals like lead and aluminium, hypolipidaemic,\textsuperscript{[16,17]} antioxidant, mild CNS depressant, anti- atherosclerotic,\textsuperscript{[19]} antiatherogenic,\textsuperscript{[20]} anti-inflammatory,\textsuperscript{[21]} antihypercholesterolaemic,\textsuperscript{[22]} improves liver function,\textsuperscript{[23]} adaptogenic,\textsuperscript{[24]} analgesic,\textsuperscript{[25]} possesses scavenging activity\textsuperscript{[26]}

Ashwagandha
Adaptogenic,\textsuperscript{[27]} attenuates nociceptive pain,\textsuperscript{[28]} antidepressant,\textsuperscript{[29]} antistress,\textsuperscript{[30]} immunomodulatory,\textsuperscript{[31,32]} free radical scavenger activity (antioxidant activity),\textsuperscript{[33]} reduces lipid peroxidation,\textsuperscript{[34]} increases superoxide dismutase and catalase,\textsuperscript{[35]} nootropic,\textsuperscript{[36]} anxiolytic,\textsuperscript{[37]} anti inflammatory,\textsuperscript{[38]} hypoglycemic,\textsuperscript{[39]} diuretic,\textsuperscript{[40]} hypcholesterolaemic,\textsuperscript{[40]} anti-apoptotic,\textsuperscript{[41]} cardioprotective,\textsuperscript{[42]} suppresses vascular endothelium growth factor (VEGF) induced neovascularization,\textsuperscript{[43]} prevent osteoporosis,\textsuperscript{[44]} prevents oxidative stress,\textsuperscript{[45]} helps in regeneration of neural tissues,\textsuperscript{[46,47]} improves memory impairment, neurite atrophy and synaptic loss in the cerebral cortex and hippocampus,\textsuperscript{[48]} prevented loss of axons, dendrites, and synapses and causes regeneration,\textsuperscript{[49]} antidiabetic,\textsuperscript{[50]} hemopoietic and rejuvenating,\textsuperscript{[51]} improves insulin sensitivity,\textsuperscript{[52]} improves reduced locomotor activity and anxiety levels,\textsuperscript{[53]} reduces elevated serum cholesterol, triglycerides, lipoprotein levels,\textsuperscript{[54]} anticoagulant, platelet antiaggregatory, lipoprotein lipase releasing,\textsuperscript{[55]} cytoprotective,\textsuperscript{[56]} increases Interferon gamma, IL-2 & Granulocyte macrophage colony stimulating factor, decreases TNF-α, interleukin-1beta, cyclooxygenase & lipoxygenase,\textsuperscript{[58]} & other cell signaling intermediates, prevents glycation induced pathogenesis, prevents aging.\textsuperscript{[60]}

Lodhra\textsuperscript{[60]}

Tulsi\textsuperscript{[61]}

Bramhi\textsuperscript{[62]}
Anti Asthmatic Activity, Anti cancer activity, Anticonvulsive, Antidepressant, Anti inflammatory, Anti nociceptive activity, Antioxidant activity, Anti stress Activity, Anti Spasmodic Activity, Anxiolytic effect, Cardiovascular activity, Gastroprotective activity, Hepatoprotective activity, Learning and memory

Manjistha\textsuperscript{[63]}
Anti-Inflammatory Effect, Neuroprotective Properties, Antibacterial Activity, Hepatoprotective Activity, Anti Diabetic Property, Radioprotective Property, Nephrotoxicity, Anti-proliferating Property, Protective effect, Antioxidant effect, Anti Ulcer Effect, Anti-Adipogenic Activity, Anti-HIV Activity, Wound Healing Effect, Anti-tumour activity

Guduchi\textsuperscript{[64]}
Anti-stress activity, enhance verbal learning and logical memory, protects against neuro- degeneration, anti-inflammatory, mild analgesic effect, anti-allergic and bronchodilator, Antioxidant activity, effective in iron-mediated lipid damage and gamma-ray-induced protein
damage, Antineoplastic and Radio-protective activity, Antipyretic, Anti-infective activity, hepatoprotective activity, anti-hyperglycemic activity, immunomodulatory action, diuretic effects, cardio-protective, anti-leptotic activity in a combination formulation, Gastrointestinal and anti-ulcer activity, Antifertility Activity, anti-osteoporotic agent, increase the blood profile and has lead scavenging activity.

Vacha\textsuperscript{[65]}
Nootropic Activity, Anti-diabetic Activity, Anti-seizures Activity, Antidepressant Activity, Neuromodulatory Effect, Anticancer Activity, Antioxidant Activity, Antihypertensive Effect, Anti HIV Activity, Cytotoxic Effect, Immunosuppressive Activity, Radioprotection and DNA Repair Activity, Coronary Vasodilator Effect, Antispasmodic and Anti-diarrhoeal Effect, Insulin Sensitizing Activity, Wound-healing Activity, Anti-inflammatory Activity, Synergistic Anthelmintic Activity, Antihypotensive Activities, Anti-ischemic Heart Disease Activity, Antifungal Activity, Antibacterial Activity, Analgesic Effect, Antipyretic Activity, Bronchodilatory Activity, Liceidal Activity, Mosquito Larvicidal Activity, Repellent and Oviposition Deterrent Activity.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>B.T.</th>
<th>A.T.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bsl- Fasting</td>
<td>160</td>
<td>100</td>
</tr>
<tr>
<td>Bsl- P.P.</td>
<td>220</td>
<td>135</td>
</tr>
<tr>
<td>Pain, aching, or burning in feet, legs</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>Pins and needles\textsuperscript{a} in feet, legs</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>Numbness (lack of feeling) in feet, legs</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>Great toe DIP joint perception of vibration in seconds</td>
<td>8 seconds</td>
<td>11 seconds</td>
</tr>
<tr>
<td>Vibration perception score</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Ankle reflexes</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

**DISCUSSION**

There were significant markable changes were found in patient of diabetic polyneuropathy due to the group of drug selected were having anti diabetic activity, Analgesic and Anti-inflammatory activity, Antistress & adoptogenic Activity, Neuroprotective Activity, Insulin Sensitizing Activity, immune booster activity. All the drugs are proven anti-oxidant reducing the oxidative stress over the peripheral nerves thus it may provide relief in numbness & paraesthesia.

All the ingredients of Mokshayan are anababishyandi, Snigdha, Srotoshodhaha and all are Rasayanaya fulfilling the ideal qualities to break the Avarana Samprapti of Diabetic Polyneuropathy. It acts both on pradhana vyadhhi and Upadra also. The major ingredients have Snigdha and Ruksa guna correcting Vata without disturbing Kapha and Pitta. The rukshtha helps in draining excess kleda and acts as antagonist to bhaudrava shleshma and medas.the ingredients possess sheeta and Ushna Veerya in equal ratio correcting both the major doshas in Avarana i.e. Kapha and Vata. Ingredients possess Madhura Vipaka correcting the Dhatuhaithilya and exerting Rasayana effect. Mokshayan acts as srotoshodhana correcting metabolism and providing relief in the symptoms.

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