A case study on Motor Neuron Disease

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ABSTRACT

Motor-neuron disease (MND) is a neuro-degenerative disease characterized by muscle wasting and loss of muscle strength. Amyotrophic lateral sclerosis (ALS) is the commonest among MND. Bibrachial amyotrophic diplegia is a variant of ALS where the disease is restricted to upper limbs. A case of Bibrachial amyotrophy characterized by weakness of both upper limbs associated with wasting was managed in SNA Ayurveda Nursing home. The condition is considered as Vataroga with special designation as ‘Bahusosha’. A 21 days treatment course was planned and executed which include Snehana, Swedana, Sodhana and Rasayana chikitsa. The patient was assessed symptomatically. A weekly assessment based on the quality of his daily activities was performed. A satisfactory improvement was observed with gradual gaining of upper limb strength. There was betterment in his gross and fine motor activities including quality of writing. The principle line of treatment was Dosha vilayana, Dosha sodhana, and Dathu vardhana which is found to be suitable for Vata – Kapha Roga.

Keywords: Motor-neuron disease, Bibrachial amyotrophic diplegia Dosha vilayana, Dosha sodhana, Dathu vardhana.

INTRODUCTION

Motor Neuron Disease (MND) is a neuro-degenerative disease characterized by compromised or towards null motor functions of body. Amyotrophic lateral sclerosis is the commonest motor neuron disease. The patient suffering from ALS express symptoms based on the site of pathology. In limb muscle onset, there is weakness of upper and lower limb muscles, resulting in challenged movements. In bulbar onset there is speech debility while in respiratory onset there is breathing difficulty [1]. These are some variant expression of ALS, where the disease is restricted to single spinal region. Bibrachial amyotrophy is one among them [2]. The present case is a case of Bibrachial amyotrophy managed in SNA, Ayurveda Nursing home. The details have been presented after taking the consent of the patient.

CASE REPORT

A 41 year old patient, male, residing and working in Chicago, USA, as a marketing analyst diagnosed with Bibrachial amyotrophy with chief complaints as bilateral upper limb weakness and wasting.

CASE HISTORY

He was apparently normal one and half years before, where he noticed sudden loss of strength in right wrist joint, with drooping of palms. This began troubling his day to day activities. He was not able to lift and throw any object. He got consulted with an orthopedician who suspected the condition as carpal tunnel syndrome or any other neurological anomaly. After 3 months he noticed the weakness spreading to right arms. He had an EMG 2 months later, which suggested the possibility of multifocal motor neuropathy. There was evidence of diffuse denervation and re-innervation in multiple upper limb muscles. After 8 months he noticed difficulty with daily performance of left hand. He again underwent EMG and MRI scanning. The reports showed minimal signs of degenerative disc changes. By next year the condition was diagnosed as MND as specially Bibrachial Amyotrophy. There was no swallowing or speech difficulty, no shortness in breath. He could walk quite a long distance without difficulty.

EXAMINATIONS

VITALS: Pulse: 78 /min
Heart rate: 78/min
Temperature: 98.7 d fh
Blood Pressure: 120/70 mm hg
CVS: S1S2 sounds heard; Normal
Respiratory system: No signs of respiratory dysfunction. No abnormal chest sounds heard.

Higher mental functions: Normal, Intact.

**Table 1: Examination of Reflexes**

| Upper Limb | Right | Left |
|------------|-------|------|
| Palmar reflex | Diminished | Diminished |
| Biceps reflex | Diminished | Diminished |
| Triceps reflex | Diminished | Diminished |

**On Palmar reflex test:** On right hand: There was slight flexion of middle finger and very mild flexion of little and ring finger.

**On left hand:** There was mild flexion of middle finger and poor flexion of other fingers.

**Table 2: Examination of Muscle Strength**

| Right Shoulder | Left Shoulder | Right elbow | Left elbow |
|----------------|---------------|-------------|------------|
| Grade 2        | Grade 2       | Grade 3     | Grade 3    |

**Inspection:** Gross muscle wasting of bilateral arms and forearms

**Palpation:** No calor

**Movements:** Right upper limb movements very much restricted compared to left upper limb.

**Table 3: Examination of Range of Movements**

| Movement | Right Shoulder | Left Shoulder |
|----------|----------------|---------------|
| Abduction | ~ 30 degree | ~ 45 degree |
| Flexion   | ~ 30 degree | ~ 45 degree |
| Circumduction | Restricted | Restricted |

**Table 4: Treatment Implemented**

| Treatment procedure | 1st day to 7th day | 2nd day to 14th day |
|---------------------|--------------------|---------------------|
| **Method**          | **Formulation used** | **Formulation used** |
| SIROVASTHI          | Head oleation      | Karpasathyadi Tailam |
| MATRAVASTHI         | Minor oil enama    | Pipplayadi anuvasana Tailam - 50 ml |
| CHOORNA PINDA SWEDAM | Powder bag fomentation | Kolakulathadi choornam with Narayana Tailam & Prabanjanam tailam for prior body massage. |
| PATRAPINDA SWEDAM   | Leaf bag massage   | Nigundhi Patra (Vitex nigundo Linn) + Karanja Patra (Pongamia pinneta Linn) + Eranda Patra (Ricinus communis linn) + Dattura Patra (Datura metel Linn) & Narayana Tailam & Prabanjanam tailam for prior body massage. |

**Radiological Findings:**

**X-Ray:** - No measurable Scoliosis / Kyphosis.

**AP/lateral:** - Mild degenerative changes in mid and lower thoracic disc spaces.

**X-Ray cervical:** - Mild degenerative disc changes evident at c5-c6, c6-c7.

**X-Ray Elbow joint (right):-** Bone structures are intact.

**X-Ray Elbow joint (left):-** The joint spaces are preserved.

**X-Ray Wrist joint (right):-** No lytic or sclerotic changes noted.

**X-Ray Wrist joint (left):-** No bony destruction demonstrated.

**MRI Brain:** No significant signal abnormalities in the brain. Major White matter tracts appear qualitatively intact with preserved. FA intensity and directional assignments.

**MRI Cervical Spine:** W/o and with contrast: - Right par central disc protrusion indents right ventral cord at C6-C7 contributes to moderate spinal stenosis at this level. Spinal Cord stenosis at C5-C6.

**FAMILY HISTORY**

Muscular dystrophy was reported for patient’s cousin.

Paternal history of sensory neuropathy.

The Creatine Kinase level was 104 U/L which was within the normal range of reference value. Vitamin B12- 144 pg/ml which was lower than the normal range of reference value given.

**TREATMENT**

The treatment pattern was arranged as 3 courses of 7 days, which include:-
| Treatment procedure       | Method                        | Formulation used                                                                 |
|---------------------------|-------------------------------|----------------------------------------------------------------------------------|
| VASTHI CHIKITSA           | YOGAVASHTI (Enema therapy)   | Erandamolaadi vasthi- 1 no’s- 800 ml                                             |
|                           |                               | Rajayapana vasthi - 2 no’s- 800 ml                                               |
|                           |                               | Snehavasthi – Pippalyadi anuvasana tailam – 150 ml                                |
| SHASHTIKA SAALI PINDA SWEDAM | Rice bag fomentation          | Shashthika Sali (Oryza sativa Linn) boiled in decoction of Bala (sida cordifolia linn) and milk and Narayana Tailam & Prabanjanam tailam for prior body massage. |

Table 5: Erandamolaadi vasthi – ingredients and quantity for single administration

| Ingredients | Quantity |
|-------------|----------|
| Makshika    | Honey    | 150 ml  |
| Saindava lavanam | Rock salt | 10 gm   |
| Sneham      | (Dhaanuantharam tailam) | 150 ml  |
| Kalkam      | Paste of Vacha (Acorus calamus Linn), Satahwa (Anethum sowa Kurz) Hapusha (Sphaeranthus indicus Linn) Priyangu (Callicarpa macrophylla vahi) Yashhtimadhu (Glyrrhiza glabra Linn), Pippali (Piper longum Linn) Vatsakabejja (Holarrhena antidicyentrica Roxb) Musta(Cyperus rotundus Linn), Tarkshysailam [4] | 30 gm   |
| Kwatham     | Decoction of root of Eranda (Ricinus communis Linn), Palasa (Butea monosperma Kuntz), Saliparmi (Pseudarthria viscida Linn), Prisniparni (Desmodium gangeticum L) Brihti (Solanum indicum Linn), Kantakari (Solanum Xanothocarpum Schrad) Gokshura (Tribulus terrestris Linn), Rasna (Alpinia galanga Linn), Bala (Sida cordifolia Linn), Gudoochil (Tinospora cordifolia willd), Aswagandha (Withania somnifera Duna), Punarnava (Boerhavia diffusa Linn), Aragwadha (Cassia fistula Linn), Devadaru (Cedrus deodara Roxb), Madanaphala (Randia dumeretorum Lam) [5] | 400 ml  |
| Gomurta     | Cow’s urine | 100 ml  |
| Total       |           | 800 ml  |

Table 6: Rajayapana vasthi ingredients and quantity for single administration

| Ingredients | Quantity |
|-------------|----------|
| Makshika    | Honey    | 150 ml  |
| Saindava lavanam | Rock salt | 10 gm   |
| Sneham      | (Vidaryadi grutham) | 150 ml  |
| Kalkam      | Paste of Vacha (Acorus calamus Linn), Misi (Anethum sowa Kurz) Syamaka (Panitum sumatrense roth), Kalingaka (Holarrhena antidicyentrica Roxb), Rasanjana (Berberis aris stata Dc) [6] | 30 gm   |
| Kwatham     | Musta (Cyperus rotundus Linn), Pada (Cyclea peltata Hi), Amrita (Tinospora cordifolia willd), Eranda (Ricinus communis Linn), Balas (Sida cordifolia Linn), Rasna (Alpinia galanga Linn), Punarnava (Boerhavia diffusa Linn), Manjishta (Rubia cordifolia Linn), Aragwadha (Cassia fistula Linn), Usura Vetiveria zizanoides Linn), Trayamana (Gentiana kuro royle), Aksha (Terminalia bellerica Roxb), Rohini (Picrorhiza kurroa Royle), Saliparni (Pseudarthria viscida Linn), Prisniparni (Desmodium gangeticum) Brihati (Solanum indicum Linn), Kantakari (Solanum Xantothocarpum Schrad), Gokshura (Tribulus terrestris Linn), Madanaphala (Randia dumeretorum Lam), Milk [7] | 400 ml  |
| Avapa       | Ajamamsa rasa (Goat meat decoction) | 100 ml  |
| Total       |           | 800 ml  |
INTERNAL MEDICATION

For this 21-day patient was given following as internal medication:

**Table 7: Internal medications administered, dosage and duration**

| Medication                  | Dosage     | Total quantity |
|-----------------------------|------------|----------------|
| Balasairyekadi Kashayam     | 60 ml      | 1260 ml        |
| Ksheerabala Tailam 7 Avarti | 2.5 ml     | 52.5 ml        |
| Shaddharanam Choornam       | 5 gm       | 25.5 ml        |
| Indukantham Gritham         | 5ml        | 105 ml         |

DIET

Patient was given simple vegetarian food with less spices.

RESULT

The response to the treatment was done by the symptomatic assessment of patient. There was a day-to-day improvement in the condition which can be concised as weekly results. Writing assessment was undergone for the patient.

**Table 8: Improvement in patient’s condition after each course**

| After completion of 7 days | Improvement in finger movements like |
|----------------------------|-------------------------------------|
|                            | • Opposing other fingers with thumb.|
|                            | • Typing in computer key board.     |
|                            | • Holding tumbler.                  |
|                            | • Raising hand up to the switch board. (∼ 90 degree) |
|                            | • Switch on and off the lights and fans. |
|                            | • He could lift and hold a mug of water for bathing. |

| After completion of 14 days | Improvement in finger movements like |
|----------------------------|-------------------------------------|
|                            | • It was noted that the quality of letters written by patient were getting better some days and, on some days, it was not up to mark. |
|                            | • Typing on key board was successful. |

| After completion of 21 days | Improvement in finger movements like |
|-----------------------------|-------------------------------------|
|                            | • Patient was able to lift and rotate (Circumduction) his right upper limb to an angle of 360 degrees with drooping wrists and left hand with a good erected wrist. |
|                            | • He was able to fold fairly the bed sheet without much ground or bed support. |
|                            | • He was able to hold and eat 8-9 spoons of food with the right hand. |
|                            | • He was able to switch on the button of his vibrating tooth brush with his right finger, using nail strength, which was previously done with left finger. |
|                            | • Removing the dirt in his nail using opposite nails which indicates fine motor movement. |

**Writing assessment:** For the same, unruled page note book was used. There was betterment in the quality of writing. Patient was writing in English language. The improvement was presented as follows.
The present condition is considered as Vatavyadhī with special designation as ‘Bahusosham’ [8]. The lesser and misdirected functions of Vata is supposed to be the resultant pathological circumstance. The treatment has been planned accordingly. Clearing the srotases and optimizing the course of Vata were the principal factors in the treatment. Vata is directed throughout the body, exhibiting both systemic and local functions. An inaccuracy even in a single site can alter the other. The treatment selected and administered was aimed for the following purposes.

Table 9: Probable mode of action of each Kriyakarma

| Treatments given | Mode of action |
|------------------|----------------|
| Sirovasthi | Clears the Srotorodha and thereby ensuring appropriate movement of Vata. |
| Matravasthi | • Provides regular expulsion of vitiated doshas, which are directed into the Koshta by Snehana and Swedana. • Balyam (strengthening). |
| Kolakulathadi choorna potalli sweda | Softens Mamsa dathu, dislodges dosha and removes Ama |
| Patra potalli sweda | Provides strength to Mamsa dathu. |
| Nasya | • Removes doshas in the form of phlegm. • Brimhana / Pushi of mastilunga (Brain tissues). • Pacify the Vata which is provoked by dosha elimination |
| Erandamooladi vasthi | • Removes the dislodged doshas which are directed into the Koshta. • Suitable in condition like muscle wasting, caused by Vata dosha, ataxia by Kapha prakopa and Vatakshaya |
| Rajayapana Vasthi | • ‘Mamsa agnibala sukra vivardhana’ [9] • Rasayana |
| Shashtika Sali pinda sweda | Strengthens Mamsadathu (providing muscle tone) |
| Shaddharana choornam | Ama pachana- Srotoshodhana-Dosha samana |
| Balasairyekadi Kashayam | Dathu poshana-Vardhana |
| Indukantham Gritam | Srotosodhana-Agnideepana, Rasayana |

The treatment principle includes lessening the progression of disease which are usually represented by the severity of symptoms and improving the strength of weakened limbs. The treatment administered can be concised as Dosa Vilayana (dislodging the vitiated doshas) 2. Dasha Sodhana (Expelling the vitiated doshas) 3. Dathu Vardhana (augmenting the dathus quantitatively and qualitatively). Based on the assessment criteria which includes the fineness in patient’s daily routine, it was clear that the treatment choices were appropriate. The results of first week assessment revealed that, the motor functions were improving. The gross motor movements had a healthier improvement than fine motor movements. The range of movements and strength of upper limbs has increased. The patient was able to manage with comparatively larger objects. The quality of fine motor movements were chiefly assessed by the method writing. By the completion of second week, there was further improvement in the assessment results regarding gross motor movements. There was inconsistency in uniform writing pattern, which was supposed to be owing to the early exhaustion of upper limb. By the end of third week, there was a much appreciable improvement in both the gross and fine movement skills. Easiness in working with both larger and smaller objects was observed. A better and consistent and uniform writing pattern was observed.

Vasthi and Nasya plays a key role in maintaining the normal course of Vata. In Vasthi, rectal route administration of medicated oil or instantly prepared emulsion drug mixture is executed. The patient is allowed to retain the same for a considerable period of time or according to the retaining capacity. Such an administration can bypass the hepatic metabolism of drug [10]. Rectal drug administration can ensure a comparatively faster absorption of drug. An expected liposomal activity of the medicated oil can thus help in the easy distribution of drug to the target cells. Nasya, the intranasal medicine administration, owns the potential to cross the blood brain barrier. The Sneha paka (generally medicated ghee or oil preparations) which may contain a polar active principle surrounded by the non-polar oil medium [11], can be easily absorbed from the endothelial cells of brain capillaries into the brain cells.

CONCLUSION

Bibrachial amyotrophy is a variant of Motor neuron disease. A case study on Bibrachial amyotrophy, which here correlated as Vatavyadhī to ‘Bahusosha’ has been done. The disease is considered as aspect of Vata pradhanah. A systematic treatment protocol including both internal and external treatment was adopted. The treatment protocol involved Snehana- Swedana, Sodhana and Rasayana. The treatment thus executed for a duration was 21 days had an optimistic impact on the disease, which was shown by the drop in the symptoms. The response of the patient’s condition to the treatment was assessed through the improvement in his daily activities. A substantial decrease in the intensity of symptoms was observed with a better quality of day to day activities. Thus, the treatment was found to be effective in managing the present ailment. Follow up treatments are necessary to acquire better results.

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