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CASE REPORT

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AYURVEDIC MANAGEMENT OF SPINAL MUSCULAR ATROPHY (SMA) – A CASE REPORT

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ABSTRACT:

Spinal muscular atrophy (SMA) is a set of autosomal recessive disorder characterized by progressive muscle atrophy and motor neuron loss, often resulting in dependency and shortened life span. SMA affects roughly 1 in 10,000 live births. According to *Ayurveda*, this disease comes under the purview of *Beeja Doshajanya Vyadhi*, *Udanavruta Prana Vata*, *Majjagata Vata* and its symptoms are *Bala kshaya*, *Karma kshaya*, *Varna hani*, *Ojokshaya* and *Marana*. A 28-year-old male graduate was admitted to SDM Hospital in Hassan, complaints of difficulty in climbing stairs and walking with assistance since seven years, associated with slurred speech for the same period of time. Initially *Rookshana* and *Avaranahara* line of management was done. Followed by *Samanya Vatavyadhi chikitsa (Brimhana)* and *Shamanoushadhi*. Patient had a remarkable improvement in symptoms and quality of life(QOL)

Key words: *Beeja doshajanya vyadhi*, *Majjagata vata*, Spinal Muscular Atrophy, *Udanavruta Prana Vata*.

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INTRODUCTION

Maintaining the health of healthy person and curing the disease of ill person is the main aim of *Ayurveda*^[1]. Maintaining healthy life also concentrate over the good progeny without any defect in children. Spinal muscular atrophy is one such disorder where defect in gene lead to various problem in their life. Spinal muscular atrophy (SMA) is defined as the degradation of anterior horn cells, which causes muscle atrophy and weakening. Over 95% of cases of SMA are caused by the homozygous deletion or mutation of the 5q13 survival of motor neuron (SMN1) gene, which is an autosomal recessive condition. An incidence of 1 in 11,000 and a carrier frequency of 1 in 54 were documented overall. The clinical characteristics of SMA can be divided into four primary phenotypes based on the age of onset and the highest level of motor function attained. The most severe kind of spinal muscular atrophy (type 1) has received special attention owing to its natural history, which is distinguished by a quick loss of motor and respiratory function in the first year of life. In contrast, research on the natural history of the less severe types of SMA (types 2 and 3) has found that motor and

respiratory function do not significantly deteriorate over the course of a year. Muscle wasting and weakening are the main clinical signs of SMA. Typically, weakness is symmetrical with proximal muscles being more affected. Taking into account the highest levels of motor function (such as sitting or standing) and age of onset, identified three SMA categories. The type 3 category was then separated by age of onset, a type 4 was created for instances with adult onset^[2]. In *Ayurveda*, it can be understood under the heading of *Anukta vyadhi* ^[3]and postulate the treatment based on *dosha dushya nidana* etc. Based on aetiopathogenesis and symptomology it can be considered as *Udanavruta Pranavata, Beeja Dosha janya vyadhi* and *Majja gata vata*.

CASE REPORT

A 28-year-old male graduate reported to Panchakarma Out Patient Department of the Sri Dharmasthala Manjunatheswara Ayurveda Hospital in Hassan with complaints of difficulty in climbing stairs and walking with assistance since seven years, associated with slurred speech for the same period of time. History of a genetic disease was not significant.

Table 1: Timeline of the disease development

Date	Relevant medical history
Early 2015	Fatigue in hand Imbalance while walking

2015	H/o Typhoid Difficulty in walking Frequent fall off Slurred speech
2021	Symptoms progressively increased Anxiety for early urination
2022	Imbalance and recursive falling while walking Unable to walk on straight line, walking on toes Numbness of lower limbs
2022 march	Admission to SDMCAH Hassan

Clinical findings

General Examination

Vital signs were confirmed to be within normal range and BP was normotensive.

BMI- 19.1kg/m²(Height- 165cms and Weight- 52kgs).

Investigations

- ❖ Molecular genetic testing for Spinocerebellar Ataxia 1, 2 and 3 was conducted in 2015; normal-sized alleles for SCA1, SCA2, and SCA3 tested negative.
- ❖ **"Mild diffuse atrophy of the whole spinal cord"** was revealed by whole spine MRI in 2021-Diagnosed as Spinal Muscular Atrophy.

- ❖ According to the NCV report, the nerve conduction examination for both the bilateral upper and lower limb nerves was normal.

Physical Examination

Neuromuscular examination

CNS examination showed that he was well oriented to time, place and person. Cranial nerves were intact. Sensory examination revealed diminished sensation over right lower extremity. Gait was ataxic. Co-ordination tests like Toe walking, heel to shin were highly significant. Superficial and Deep Reflexes are within normal limit.

Table No 2 :- Before Treatment

Sl No	Parameter	Result
1	Muscle power	3/5 in B/L lower limbs
2	Muscle tone (Modified Ashworth scale) ^[4]	Grade 3

3	Berg Balance Score ^[5]	22 (Total 56)
4	Barthel index of daily activities ^[6]	13 (Total 20)
5	Co-ordination tests	Knee to heel and Romberg sign both were positive.

Diagnosis

Based on the clinical characteristics and MRI, it was diagnosed as SMA type 3. Muscle weakness was seen after early childhood (*Mamsa bala kshaya*), individuals can stand and walk unaided but over time, walking and climbing stairs become increasingly difficult (*Karma kshaya*) and may require wheel chair assistance in the later part of life (*durbala*) and has a normal life expectancy. Slurred speech (*Vakgraha*) was also seen in this case (as

Udana vata gets avarana). By these symptoms, it can be considered as *Udanavruta prana vata* and *Majjagata vata*.

Plan of care

Clinical characteristics and diagnostic results were taken into account as a basis for the selection of specific treatment modality. Initially *Rookshana* and *Avaranahara* line of treatment was done. Followed by *Brimhana chikitsa*. During the course of treatment *Shamana Aushadi* were also given.

Table No 3 :- Time line of intervention

Date	Panchakarma Intervention
7/3/22 to 10/3/22	1.Sarvanga Udwartana with <i>Kolakulattadi</i> and <i>Triphala choorna</i> followed by <i>Parisheka</i> with <i>Dashamoola kashaya</i> 2. <i>Pratimarsha Nasya</i> with <i>Kalyanaka ghrita</i> 2 drops in each nostril. 3. <i>Shiropichu</i> with <i>Kalyanaka ghrita</i>
11/3/22 to 17/3/22	1.Sarvanga Abhyanga with <i>Ksheerabala taila</i> followed by <i>Shastikashali Pinda Sweda</i> . 2. <i>Mustadi Yapana Basti</i> - modified <i>Kaala Basti</i> <i>Anuvasana basti</i> - <i>Mahamasha taila</i> - 60ml+ pinch of <i>saindhava lavana</i> + <i>shatapushpa</i> . <i>Niruha Basti</i> <ul style="list-style-type: none"> • <i>Madhu</i>- 60ml • <i>Saindhava</i>- 8gms

	<ul style="list-style-type: none"> • <i>Sneha- Mahamasha</i> taila 60ml • <i>Kalka- Ashwagandha, Musta, Shatavari</i>- Each10gms <p><i>Kashaya- Mustadi Yapana Ksheerapaka</i>- 250ml</p>
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Table No:- 4 Shamana Aushadhi

Sl.No	Shamanoushadhi	Time of Administration
1	<i>Vak shuddhikara churna</i> 5gm with honey	Once daily in the morning before food
2	<i>Dhanadhanayadi Kashaya</i> 10ml-0-10ml and <i>Ashtavarga Kashaya</i> 10ml-0-10ml (taken together along with lukewarm water)	Twice daily in the morning and night before food
3	<i>Ashwagandha churna</i> (5gms)+ <i>Jatamamsi churna</i> (2.5gms) + <i>Shatapushpa churna</i> (2.5gms) 10gm-0-10gm	Twice daily in the morning and night after food with warm water
4	<i>Brihat Vata Chintamani Rasa</i> 250mg 1-0-0	Once daily in the morning after food

Follow up and Outcomes

Significant improvement in the symptoms was observed after the treatment.

Table No: 5 Pre and Post treatment parameter changes

Parameters	BT	AT
1.Muscle power (MRC Scale)	3	4
2.Modified Ashworth scale	Grade 3	Grade 2
3.Berg balance scale	22	27
4.Barthel Index of Daily Activities	13	15
5.Niruha Basti retention time	30 seconds	2 mins
6. Walking without support for about 1 metre	Not possible	Possible
7. Agni	<i>Mandagni</i>	<i>Madhyamagni</i>

DISCUSSION

“Sarva hi cheshtah vatena sa pranah praninam smritah”^[7] refers to the fact that Vata is responsible for both sensory and motor processes in the body. There is no explicit mention of SMA in our *Samhita*, it is one of the inherited diseases. This would fit under the category of *Anukta Vyadhi* purview. By considering *Dosha*, *Dushya*, *Agni*, *Koshta* and other factors we diagnose the pathology as *Majjagatavata* and *Udanavruta Prana Vata* as well as hereditary condition as *Bijabhaga Dusti*. *Dhatu Kshaya* or *Margavarodha* cause Vata vitiation that leads to *Dhatu Sosha*^[8]. *Garbha*, *Shukra* and *Arthava (Bija)* will become vitiated as a result of the vitiated Vata. The impacted area of the *Bijas* similarly affects an identical area of the foetus. ***Yasya hi avayavasya bijabhage... “Majjavahini dushyanti viruddanam cha sevanat”***^[9]

By the above diagnosis, we adopted *Samanya avaranahara chikitsa* (as it is *Srotoshuddikaraka*, *vatanulomana*, *anabhishtyanda* and does *Kaphapitta Avirudda Chikitsa*^[10] then followed by *Samanya Vatavyadhi Chikitsa* like *Brimhana (Sarvanga Abhyanga, Shashtika shali pinda sweda, Mustadi rajayapana basti)*).

Probable mode of action of the Treatment

Udwartana is said to be the best *Rookshana*, it does *Kaphahara* and *Medo pravilayana* and

provides *Sthirakarana* of the *Anga*^[11]. *Acharya Bhavaprakasha* as specified that *Udwartana* as *Balya* and *Shonita krita*^[12] (enhance blood circulation). It facilitates the opening of tiny channels and enhances lymphatic and blood circulation^[13].

Pratimarsha Nasya is *Ajanma maranam shastha* (beneficial from conception to death, just like *basti*), it can be used at any time of a day throughout the year. Continuous use of *Pratimarsha Nasya* benefits same as that of *Snehana*, *Virechana Nasya* and does *Brimhana*^[14]. *Kalyanaka ghritha* was used as *Pratimarsha Nasya*, it helps to regain the *vaksmriti* and anxiety^[15].

Shiro pichu was done with *Kalyanaka gritha*. It improves circulation and as a result, the brain's blood flow increases, which is crucial when under stress^[16]. It influences *Tarpaka Kapha*, *Sadhaka Pitta*, and *Prana Vayu* to function in best way. *Abhyanga* is stated to be best modality to pacify Vata. It is *Atyarthabalakarmani*^[17], *Dardhyakritha*^[18], *Mrujavarna Bala pradha*, does *Dhatupushti*, *Mardavakara* and *Kaphavatahara*^[19]. If *abhyanga* is performed for 900 *Matra kaala* it reaches till *Majja dhatu*. *Shashtika Shali Pinda Sweda* is the form of *Snigdha sveda* well known for its *Stambha*, *Shoola Gauarava nigraha*, *Mardavata* of *Anga*^[20]

Though it's a *svedana* it has properties of *Brimhana*. Here *Shashtika Shali* is processed with the *Rajayapana qwatha* and *Dashamoola qwatha* which in turn provided additional benefits of *Brimhana* and *Vata Shamana*.

Mustadi Yapana Basti has *Sadyobalajanana*, *Rasayana* (immune modulation) and *vatahara* property^[21]. As a result, *Vata Shamaka Guna* strengthens and harmonises *Vata Karma*. *Deepana* and *Pachana* properties aid in *Agni Vruddhi*, which in turn leads to metabolic transformation of all dhatus. The majority of the drugs in the *Yapana Basti* include *Tikta Rasa*, which aids in *Asthi* and *Majja Dhatu* regeneration. As a result of *Madhura Rasa* and *Guru Guna*, *Rasayana*, *Vrushya*, *Balya* and *Medhya* are imparted.

CONCLUSION

With our interventions, this patient had a remarkable improvement in muscle tone, power and the recovery of a few motor abilities within a short period of time. Hence a formulated *Ayurvedic* therapy protocol can improve the condition of SMA patients providing a quality life, minimizing their dependency.

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