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Management of Spastic Cerebral Palsy due to Wallerian Degeneration through *Majja Kshira Basti* – A Case Study

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Abstract

Introduction:

Cerebral palsy (CP) is a group of permanent movement disorders that appear in early childhood. Wallerian degeneration is one of the major pathology in spastic cerebral palsy. Wallerian degeneration is a process that results when a nerve fiber is cut or crushed, in which the part of the axon separated from the neuron's cell body degenerates distal to the injury. Wallerian degeneration occurs after axonal injury in both the peripheral nervous system (PNS) and central nervous system (CNS Cerebral palsy (CP) is the leading cause of childhood disability affecting function and development. It occurs in about 2.1 per 1,000 live births. Cerebral palsy is caused by abnormal development or damage to the parts of the brain that control movement, balance, and posture., As it is a multi-factorial disease with clinical features of a wide variation, it cannot be correlated with any single disease or condition in Ayurveda. According to *Vāgbhaṭa*, it can be classified in the disease categories of *sahaja* (hereditary) and *garbhaja* (congenital) type of diseases. It can be taken as *Vata Vyadhi* as far as its etiology and symptomatology are concerned.

Aim: To assess the effect of *majja kshira vasti* in the management of CP due to cerebral atrophy.

Materials and Methods: A 4-year-old male child with spastic type of CP due to cerebral atrophy because of Wallerian degeneration came to OPD of GAC, Hyderabad. Patient was treated with *abhyanga* followed by *sarvanga swedana* and then with *majja kshira vasti* for 10 days. The same course of treatment has been repeated for 3 times with an interval of 15 days. Results of treatment were assessed with anthropometrical measurement, Modified Ashworth Scale, muscle power grading along with motor and sensory symptoms.

Result: The above treatment protocol of *Ayurveda* shows good result in patient especially by improving growth and development, reducing spasticity of right upper limb and muscle spasm with an overall 40- 50 % improvement in the symptoms of the patient.

Conclusion: Multisystem approach is needed to improve the condition of the patient. *Panchakarma* along with internal medication should be given to improve all the facets of spastic CP. Basti acts by their own mode of action and can be used freely for such disease conditions.

Keywords *Cerebral Palsy, Wallerian Degeneration, Majja Kshira Basti, Panchakarma in Pediatric*

Greentree Group

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INTRODUCTION

Cerebral palsy (CP) is the leading cause of childhood disability affecting function and development. CP is defined as a non-progressive neuro motor disorder of cerebral origin. Cerebral palsy (CP) is a group of permanent movement disorders that appear in early childhood. Signs and symptoms vary between people. Often, symptoms include poor coordination, stiff muscles, weak muscles, and tremors[1]. CP is classified into four types viz., spastic, ataxic, dyskinetic, and mixed. Spastic CP accounts for a major portion of CP with incidence between 70% and 80%.Wallerian degeneration is a process that results when a nerve fibre is cut or crushed, in which the part of the axon separated from the neuron's cell body degenerates distal to the injury. Wallerian degeneration occurs after axonal injury in both the peripheral nervous system and central nervous system[2]. In the peripheral nervous system, regrowth tends to be more rapid than in the central nervous system[3].

Population-based studies from around the world report prevalence estimates of CP ranging from 1.5 to more than 4 per 1,000 live births.[4] Of the many types and subtypes of CP, none has any known "cure." Autologous stem cell activation treatment to expand the blood vessels and nourish the neurons, strengthening of body's immune system, stem cell transplantation procedure, Botulinum toxin type A injection[5], baclofen intrathecal injection[6], orthotic devices such as ankle-foot orthoses, hyperbaric oxygen therapy[7], are the newer advancements being tried out in the management of CP.

There is no such correlation available in *Ayurvedic* classics with CP, but there are many conditions and some causative factors linked to etiopathology for such type of disease condition described in many chapters in different texts. Contributory factors like inappropriate *ṛitu, kṣhetra, ambu* and *bīja*[8]*,dauhṛdāvamanana*[9] (neglect of urges of pregnant women), presence of *garbhopaghātakarabhāva*[10] (substances which can cause defects or death of foetus), and improper *Garbhiṇīparicaryā*[11] (antenatal regimen) may have undesirable effects on the foetus hampering its normal growth and development consequently leading to many diseases, deformities, and even death. In Ayurveda it can be described as *Shiromarmaghat janya vata vyadhi* which may manifest as many conditions such as *Ekanga Vata, Ardhanga Vata*, etc.

CASE STUDY

Name: XYZ

Age: 3.5 years

Sex: Male

Religion: Hindu

Socioeconomic status: Middle class.

Chief Complaints

- Delayed milestones.
- Stiffness in limbs esp. in right upper limb.
- Loss of movement in right upper limb.
- Unable to walk without support.
- Weakness in right side of body.
- Increased tone in right side of body.
- Slurred speech.
- Short term memory and impaired new learning abilities.

History of present illness:

Patient was delivered by lower segment caesarean section (LSCS) at full term and did not cry soon after birth and also suffered from birth asphyxia and neonatal jaundice. Due to all these clinical complications, the child could not achieve normal growth and development. Spasticity and restriction of movements in right upper limb with delayed milestones became apparent after the age of 5 months.

History of past illness

Birth asphyxia, Neonatal jaundice

Treatment history

The child was being given tablet baclofen (as a muscle relaxant). He was undergoing physiotherapy since 1 year

Family history

No family history and consanguinity found.

Birth history

Antenatal: Normal

Natal: Full term LSCS (due to breech presentation and primiparity of mother) was done.

Baby did not cry soon after birth. Birth weight was 2.5 kg.

Postnatal: Birth asphyxia, neonatal jaundice.

History of immunization

Proper for age.

Milestones History:

Table 1 Comparison of delayed mile stones with right age of attainment

Mile Stones	Attained age	Right age
1. Gross Motor		
Neck holding	3rd month	3rd month
Sitting with support	8th month	5th month
Standing with support	14th month	9th month
2. Language		
Pronouncing mono-syllabus	12th month	6th month
Pronouncing bi-syllabus	14th month	9th month

Examination

- Vitals were normal.

- Cardiovascular system, respiratory system and per abdomen examinations had shown no deformity.
- *Prakṛiti* (constitution) was *Vātādhikakapha.*

Aṣṭavidhaparīkṣā:

- *Nāḍi (*pulse)- *Vātādhikatridoṣaja.*
- *Mūtra* (urine). Frequency and color = Normal.
- *Mala* (stool) – Constipated
- *Jihvā* (Tongue)- *Sāma* (coated suggestive of improper digestion)
- *Śabda* (speech)- Sluggish, unable to speak sentences
- *Sparśa* (touch)- hard and dry (due to hypertonia and spasticity).
- *Dṛik* (eyes) – Normal
- *Akṛiti* (appearance)- lean (due to malnourishment).

Central nervous system examination

➢ Hypertonia (spasticity) and contractures at elbow and wrist joint.

➢ Muscle power –

Upper limb	Right	Left
	2	3
Lower limb	3	3

➢ Sensory system was intact, and no abnormality found.

➢ Cranial nerve examination = Normal

➢ Hyperreflexia was present, suggestive of upper motor neuron disease (which is the hallmark of CP).

➢ Babinski sign= positive.

Table 2 Examination findings

Motor examination	**Right limb**		**Left limb**	
	Upper	**Lower**	**Upper**	**Lower**
1. Muscle bulk	Wasting present	Wasting present	Normal	Normal
2. Muscle power	Grade 1	Grade 3	Grade 4	Grade 4
3. Muscle tone	Hypertonic	Hypertonic	Normal	Normal
4. Deep tendon reflex				
Biceps	Exaggerated	Exaggerated	Normal	Normal
Triceps	Exaggerated	Exaggerated	Normal	Normal
Knee	Exaggerated	Exaggerated	Normal	Normal
Ankle	Exaggerated	Exaggerated	Normal	Normal
Sensory examination				
Touch	Normal		Normal	
Pain	Normal		Normal	
Temperature	Normal		Normal	
Co-ordination test				
Finger nose test			Normal	
Involuntary movements			Absent	

MRI (T2) findings-

- Loss of volume of entire left cerebral hemisphere with prominence of ipsilateral CSF spaces

- Loss of volume of left side of brain stem due to Wallerian degeneration.
- Gliosis in left perisylvian cortex

Differential diagnosis

- Spastic CP,
- Demyelinating (degenerative) disease of central nervous system (CNS),
- Sequel of postnatal hypoxia.

Diagnosis

Monoplegic spastic CP" as a sequel of cerebral atrophy due to Wallerian degeneration.

Treatment Plan- The total duration of treatment was of 2 months in which mainly the *Vata Shamaka Panchakarma* therapy along with oral drug was given.

A) Treatment in 1st sitting (for 10 days) -

1. *Sarvanga Abhyanga – Bala Ashwagandha Taila*[12] for 20 mins.

Sarvanga Mridu Nadi Swedana – Dashmoola Kwatha for 5-7 mins

2. *Matra Basti - Majja Kshira Basti*

(*majja* = 20 ml, *kshira* = 20 ml *praksepa dravya*= ½ *brahmi vati* along with *shatavari* and *ashwagandha* powder in very little quantity)

B) Oral medicine – Given to patient between 2 *Panchakarma* therapy sittings for a period of 1 month

Syrup *Shankhpushpi* - 10 ml. BD

Ashtanga Ghrita - ½ tsp BD

Kumara Kalyana Rasa - 1 BD

Treatment in 2nd sitting (for 10 days) – The treatment which was given during 1st sitting was repeated.

C) Treatment in 3rd sitting (for 10 days) – The treatment which was given during 1st sitting was repeated.

RESULTS

BT-AT Comparison – Such 3 sittings of 10 days each are given to the patient at interval of 15 days. After 2 months of treatment the improvement in the signs and symptoms of the patient is shown in the table.

Table 3 BT-AT comparison

Before Treatment	**After 1st sitting**	**After 2nd sitting**	**After 3rd sitting**
Unable to walk Without Support	Able to walk few steps without support	Able to walk 5-8 steps without support	Able to walk without support
CNS Examination	**Before Treatment**	**After 1st sitting** / **After 2nd sitting**	**After 3rd sitting**
Nutrition of The Right Muscle	Atrophy	Slightly improved / Improved	Muscle bulk

	Left	Normal	Normal	Normal	Normal
Muscle Tone	Right	Hyper-tonicity +++	Hyper-tonicity ++	Hyper-tonicity +	Normal
	Left	Normal	Normal	Normal	Normal
Plantar Reflex	Right	Extensor	Extensor	Extensor	Extensor
	Left	Flexion	Flexion	Flexion	Flexion
Knee Jerk	Right	++++	+++	++	++
Ankle Jerk	Right	++++	+++	++	++
Muscle Power	Right	Grade- 1	Grade- 2	Grade- 3	Grade-3+
	Left	Grade- 4	Grade- 5	Grade- 5	Grade-5
Mental Status					
Speech		Slurred	Slightly Improved	Improved	Improved
Memory		Short term New learning Abilities impaired	Mild improvement	Improvement	Marked Improvement

Table 4 BT AT comparison of anthropometric parameters & scales related to CP

S.No.	Parameter	BT	AT
1.	Weight (in kg)	8	10
2.	Height (in cm)	82	84
3.	Head Circumference (in cm)	41	43
4.	Chest Circumference (in cm)	50	52
5.	Modified Ashworth Scale	3	0
6.	Spasm Scale	4	3
7.	MACS	4	2

DISCUSSION

Parameters of growth, goniometric evolution to assess the range of motion (ROM), Ashwarth scale to assess spasticity, were taken as assessment criteria to observe the effect of therapy. The treatment plan was devised in order to improve the overall condition of the patient. Also, the symptoms relate it to the *Pakshavadha* described in Ayurveda which is a *Vataja* disorder and thus the treatment was planned on the line of *Vatavyadhi Chikitsa*. The 2 months of treatment had significant improvement in the condition of the patient.

The probable mode of action of the Treatment Procedures:

The *Sarvanga Abhyanga* and *Nadi Sweda* provide nourishment; pacify *Vata* and produces softness as *Mardavajanan* (production of softness) is the property of both *Abhyanga* and *Swedana. Bala*

Ashwagandha Taila contains mostly *Tridosha* especially *Vata* hara and *Balya* (nourishing) ingredients, thus, can be attributed to pacify *Vata* and provide nourishment. In addition, the *Dashmoola Kwatha Nadi Swedana* pacifies *Vata*, as the main action of *Dashmoola* being *Vatahara* it also acts to reduce spasticity (*Stambha*), Hypertonicity (*Gaurava*), and produces sweat thus softening the skin.

"*Basti*"[13], is known to be the best to pacify *Vata*. This *Majja Kshira Basti* given in the form of *Matra Basti* alleviates *Vata*, purifies the body by removing toxins carrying out *Mridu-shodhana* and provide nourishment to the patient. As it is said in Ayurveda classics that brain contains *majja* in the form of *masthishka majja* and in above case due to cerebral atrophy there is *kshaya* of *majja* in brain. Hence, *Majja Kshira Basti*. *Majja*, have *Ushna Virya*, *Guru Vipaka* and potent *Vatahara* properties. . *Kshira* has *Snigdha*, *Madhur* and *medhya* properties which may further do *Shamana* of *Vata Dosha* .*Brahmi*, *Ashwagandha* and *Shatavari* powders which are used in *matra basti* as *prakshepa dravyas* are the *Medhya Rasayanas* which have nootropic effects (Stimulation of Mental activities and increasing intellect) as they are nervine tonics[14].

Thus, by the combined actions of the different therapies and drugs, there is overall relief in the symptoms of the patient as per the results shown. All this progress attributes to the *Vata Shamaka* and *Brihmana* properties of drugs used in the treatment.

CONCLUSION

As observed from the results, in first month the effects of the treatment were a success, though minimal which results in decreased atrophy and hyper tonicity of the muscle with some improvement in mental functions. Whereas when the treatment was further extended there was significant improvement in almost all the parameters taken. The muscle power increased to grade 4 in both right upper and lower limb and a significant improvement was noted in mental functions. Hence, the damage brought about by cerebral atrophy due to Wallerian Degeneration though not fully reversed but can be improved to a significant extent especially in case of moderate Cerebral Palsy as this one. And with the continuation of the treatment we hope for much better results coming forth.

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