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Case Study

CASE STUDY OF AYURVEDIC MANAGEMENT OF SPASTIC CEREBRAL PALSY

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ABSTRACT

Cerebral palsy is a group of permanent, non-progressive motor impairment syndromes secondary to lesions or anomalies of the brain arising in the early stages of its development. It has a high prevalence rate of 2- 3 per 1000 children. Among the various types, spastic cerebral palsy remains the most common, affecting about 61% of all people with cerebral palsy. In Ayurveda, this could be taken as a *Vata* predominant condition and included as *Sarvangavata*. *Vatavyadhi* treatment like *Snehana*, *Swedana*, *Shodana* and *Brimhana*, along with supportive therapies could give wonderful results.

An 8 ½-year-old boy, a known case of post meningeal hydrocephalus with spastic cerebral palsy was treated in the In-Patient Department of Government Ayurveda College, Thiruvananthapuram. He was treated based on the principle of *Vatavyadhi chikitsa* with various Ayurvedic medicines internally and appropriate *Panchakarma* procedures, along with physiotherapy and speech therapy. He has been assessed before and after the treatment using the Modified Ashworth Scale and Barthel Index, and noticeable improvement has been got. Here spastic cerebral palsy was managed solely using Ayurveda medicines, the apt *Panchakarma* procedures and supportive therapies. Significant improvements in the quality of life of the child was seen. Ayurveda treatments along with supportive therapies are highly effective in managing spastic cerebral palsy, thereby imparting a better standard of living.

INTRODUCTION

Cerebral palsy refers to the permanent, nonprogressive and occasionally evolving disorders of tone, movement or posture, caused by an insult to the developing brain. It is the most common chronic motor disability of childhood, affecting 2-3 infants per 1000 live births [1]. Developmental delay & disturbances in sensation, cognition, communication, and perception is often noted in the disease. Causes could be antenatal, natal or post natal. Antenatal causes could be genetic or chromosomal abnormalities, structural malformations of the nervous system, congenital or intrauterine infections including TORCH infections, maternal or obstetric complications, teratogens etc. Natal causes include prematurity, seizure, meconium aspiration, sepsis, birth asphyxia, low birth weight, birth trauma, intracranial haemorrhage, hyper-bilirubinemia, hypoglycaemia, central nervous system (CNS) infections, etc. The Postnatal causes could be infections like meningitis or other CNS infections, brain injury, toxins, hypoxia, trauma, etc. Cerebral palsy is classified topographically as Quadriplegic, Hemiplegic, Monoplegic or Diplegic [1]. Physiologically the main types are Spastic, Dyskinetic, Ataxic, and Mixed Cerebral Palsy [1]. Among these, Spastic Quadriplegia is the most common type of cerebral palsy in India [1]. It is often caused by perinatal asphyxia or neonatal illness.

In the Ayurvedic point of view, this being a *Vata* predominant condition, could be included under the *Sarvangavata* perspective. *Sarvangavata* is the condition of *Vata* predominance that affects all over the body and associated with stiffness and difficulty in joint movements [2], including contractures. *Vatavyadhi* treatment like *Snehana*, *Swedana, Mridushodana* and *Brimhana* [3] could bring about relief to the condition. As the objective of any treatment is to improve the limitations brought on by a disease, assistive therapies

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of rehabilitation should also be used in the management of conditions like cerebral palsy.

Patient Information

8 ½ year old male child had reported to the outpatient department with complaints of large head size, difficulty in walking without support, stiffness of both upper and lower limbs- right side being stiffer than left, and reduced clarity of speech.

History of presenting complaints

Case history revealed that he is the second of the twins born of non-consanguineous parents and was born through normal vaginal delivery at 36 weeks of gestation, owing to the twin pregnancy. The male baby had a birth weight of two kilograms. The baby cried soon after birth and was in the neonatal intensive care unit (NICU) for a day as he was small for the gestational age. The female child who was the first of the twins had a birth weight of 1.8 kg. She was also admitted to the NICU for 15 days for being small for the gestational age. Over the days, she gained weight. So was received by the mother on post natal day (PND) 15 and has had no significant health issues since then. The male child was received by the mother on PND2 and breastfeeding was initiated. On PND4 the male child developed a fever that was not controlled by medicines. On PND10 he developed a fever with seizures presenting as tonic-clonic movements of all limbs. He has been on Anti-Epileptic Drugs (AED) since then. As the fever stayed uncontrolled, lumbar puncture was done which revealed meningitis with Klebsiella infection, and was managed by I.V Antibiotics. Later, at 2 ½ months, the increasing head size of the male child was noted and consulted a nearby hospital. He was diagnosed with post meningeal hydrocephalus and right sided subgaleal shunt was placed. At the baby's 6th month of age Left VP shunt was also placed. Around this time, the mother started noticing stiffness in both upper & lower limbs of the child. Also a delay in all milestones was noted. He was given routine allopathic treatments, but not much improvement was got. He then took 2 course treatments at Government Ayurveda College, Thiruvananthapuram, in a gap of 6 months and got considerable improvements. He underwent the 3rd course recently.

Antenatal history

At the time of conception, the mother was 27 years old and the father was 43 years old. Regular antenatal checkups were taken. Mother was under hypothyroid medications since the first trimester when it was diagnosed. Iron, folic acid and calcium supplements taken throughout antenatal period. No history of mental stress was reported.

Natal history

The patient was born as one among twins at the 36th week through normal vaginal delivery. He cried soon after birth and had a birth weight of 2.0 kg. No respiratory distress was noticed. The baby was shifted to NICU for a day owing to being small for the gestational age and was stabilized thereafter.

Postnatal history

On PND4 the child developed fever which was not controlled by medicines and on PND10 it developed to a fever with seizures. Meningitis was diagnosed and managed by IV antibiotics.

History of past illness

Mumps at 1 ½ years of age

Developmental history

Gross motor milestones

Neck holding: 2 years
Turning over: not attained
Sitting with support: 2 ½ years
Sitting without support: 3 years
Standing with support: 3 ½ years
Standing without support: 5 years
Walking with support: 4 years
Walking without support: few steps at 8 years

Fine Motor milestones

Grasping: 2 ½ years
Buttoning: not attained
Self-feeding: not attained properly

Social and adaptive milestones

Social smile: 1 year
Indicates his wants: 1 year
Dresses unassisted: not attained

Language milestones

Monosyllables: 2 ½ years
Bisyllables: 3 years
Small sentences: 4 years with reduced clarity
Storytelling: not attained
Family history
Nothing relevant
Immunization history
Immunised up to age

Dietetic history

Exclusive breastfeeding was done till 6 months of age and weaning began with ragi, banana powder, etc.

At present- adult diet

Personal history

Diet - non vegetarian
Appetite - reduced
Sleep - sound
Hygiene - good

Bowel habits - normal
Bulks of stools - normal
Bladder – Within normal limits
Habits - day sleep
Allergies- nil

General examination

General comments: The child was pleasant, cooperative and of lean body build. He had an abnormal posture due to spasticity, with the right arm semi flexed, the right hip slightly deviated to the left and the right ankle dorsiflexed. His left limb had an almost normal appearance. He had a crouching gait. His jaw has slightly deviated to the left side. His head showed frontal bossing and the occiput was flat. The eyes showed sunset sign. There was also a convergent squint.

Vital signs

Pulse rate- 88/minute
Temperature- 37degree C
Respiratory rate- 17/minute
Heart rate- 88/minute

Anthropometry

Head Circumference - 53 cm
Height - 132 cm
Weight - 29 kg
Mid Upper Arm Circumference - 17cm Bi-Laterally (B/L)
Mid-thigh Circumference - 31.5 cm B/L
Mid-calf Circumference - 24 cm B/L

Systemic Examination

When the locomotor system was examined, the stiffness of upper and lower limbs was noted, the right limb being stiffer than the left. Palpation revealed no tenderness or increased warmth. There was limited joint movement, right side being affected more than the left.

Central nervous system examination:

Higher Mental Functions

Appearance- calm, cooperative
Behaviour- pleasant, attentive
Level of consciousness- conscious
Delusion, Amnesia, Hallucination, Illusion, Dementia- absent
Sleep- sound
Orientation of place and time- present
Memory-normal
Intelligence- reduced
Speech- with decreased clarity
Dysphonia- absent
Dysgraphia- not able to assess
Echolalia- absent
Gait- abnormal, crouching gait
Emotions- normal

Cranial nerves

All the cranial nerves were tested and the nerves 3,4,5,6,7,11 were found to be affected.

On examining the nerves 3,4,6 B/L convergent squint was revealed and it was found that the child could not rotate the eye in all directions. While examining the 5th cranial nerve, jaw deviation to the left side was noticed. While examining the 7th cranial nerve, decreased wrinkles on the forehead was revealed. While examining the 11th cranial nerve, shrugging of the right side of the shoulder was found to be difficult. All the other cranial nerve functions were found to be intact.

Ptosis - left eye
Nystagmus - absent
Co-ordination of movements
Finger nose test- not possible
Heel knee test- not possible
Lateral and posterior column sensations- normal
Cerebellar signs- absent

Motor system

Muscles Tone- Hypertonic, spastic
Muscle power- reduced.
Deep tendon reflexes- exaggerated, with bilateral ankle- clonus.

Ashta Sthana Pareeksha

The patient was having *Nadi* of *Vathakapha* predominance, *Prakritha mootra* and *Prakritha mala* (bladder and bowel- within normal limits), *Jihwa anupalepatvam* (tongue uncoated), *Aspashta swaram* (speech- with reduced clarity), *Anushna sheeta sparsam* (neither hot nor cold on touch), *Krisha aakrithi* (lean build), *Drik- ishat avyaktam* (poor vision).

***Vyadhi Visleshanam* (Analysis of Case)**

Dosha- *panchavayu* are found to be affected (*Prana, Udana, Vyana, Apana, Samana vayu*). Amongst *Pitha, Pacaka, Alochaka* and *Sadaka* are found to be affected. Amongst *Kapha*, *Shleshaka, Tarpaka* and *Avalambaka* are affected.

Dooshya- *Sapta dathus* are involved with predominance of *Rasa, Rakta, Mamsa, Meda, Asthi, Majja. Snayu* and *Kandara* are also involved.

Agni is *Vishamagni*. There is *Jadaragni* and *Dathwagni mandya*.

Srothas involved are *Rasavaha, Raktavaha, Mamsavaha, Medovaha, Asthivaha*, and *Majjavaha.*

Rogamarga is *Madyama rogamarga*.

Diagnosis-Spastic cerebral palsy (*Sarvangavata)* [2]

Sampraphti: It is the *Mashtishkavarana shotha* (Meningitis) and *Sheershamburoga* (Hydrocephalus) that have lead to the condition here. The *Aganthu nidana* -Klebsiella infection caused a *Masthishkavarana shotha* which lead to *Sheershamburoga*. This caused a *Srotovaigunya* further causing a *Pratiloma gati* of *Vayu*. This *Vata vaigunya* is of *Prana pradhana panchavayu* with *Sthanasamsraya* at *Shiras*. The vitiated *Doshas* affected normal brain functioning, caused stiffness of joints and ligaments of upper and lower limbs causing difficulty in movements and abnormal presentation of the limbs. Thus resulting in the manifestation of *Sarvangavata*. The condition caused the delay in achieving the developmental milestones and contributed to the impaired speech and activities.

Investigations

Routine blood and urine analysis done were within normal limits.

MANAGEMENT

The internal medicines selected were of *Vatasamana* and *Brimhana* properties (Table 1). The external treatments done were also *Vatahara* treatments aimed to give better stability (Table 2).

Table 1: Medicines Given Internally with Dose

Sl.No.	Medicine	Dose	*Anupana*
1	*Rasnerandadi kashaya*	30 ml b.d. a.c	Honey
2	*Balarishta*	15 ml b.d. p.c	
3	*Vaiswaranam choorna*	½ teaspoon b.d. mixed in Kashaya	
4	*Sukumaraeranda*	8 drops b.d. h.s. p.c	Milk
5	*Dhanwantharam* tablet	1 b.d. p.c	Honey
6	*Saraswatha choorna*	½ tsp. b.d. a.c.	Honey
7	*Kalyanaka ghruta*	10 drops b.d. a.c	

b.d. -twice daily; a.c.-before food; h.s.-at bedtime; p.c.-after food; tsp.-teaspoon

Table 2: Procedures Done Externally with Duration

Sl.No.	Procedure	Duration
1	*Utsadana* with *Kolakulathadi choorna* and *Dhanyamla*	7 days
2	*Abhyanga* with *Mahanarayana taila*	7 days
3	*Siro pichu* with *Lakshadi taila*[4]	From day 8 onwards
4	Spine *pichu* with *Dhanwantharam taila* and *Nimbamruthaeranda*	From day 8 onwards
5	*Upanaha* with *Kolakulathadi choorna*	Throughout the period
6	External application of *Ksheerabala avarthi* on eyelid	Throughout the period
7	*Patra potala sweda* with *Vatahara* leaves	7 days
8	*Sirolepa* with *Rasnadi choorna* in *Kalyanaka ksheera kashaya*	7 days
9	*Dwipanchamooladi Yogavasti* [5]	8 days
10	*Godhuma lepam*[6] over whole body	7 days

During the period of stay in the hospital, Physiotherapy and Speech therapy were also done. Physiotherapy is often an exercise program adapted to the needs of each individual [7]. The active involvement of the patient enables the achievement of a better range of movements of the joints. Speech and language therapy focuses on maximizing an individual's communication skills [8].

OBSERVATIONS AND RESULTS

Assessment of spasticity was done using The Modified Ashworth Scale. This is the most widely accepted clinical scale to measure the increase of muscle tone or spasticity [9]. As per this scale, spasticity is graded from 0 to 4, with grade 0 being the normotonic state and grade 4 being the most spastic [10]. On analysis before and after the treatment, the spasticity grades showed improvement. Before treatment, the right upper and lower limbs showed such an increase in tone that the passive movements were also difficult. After treatment, though the tone was still increased, there was an ease to the movements of both the upper and lower limbs of the right side. The left upper and lower limbs of the child were comparatively less spastic and showed a slight increase in tone. The left lower limb also showed resistance through some movements. After treatment,

both the upper and lower limbs of the left side had a normal tone (Table 3).

Muscle strength was evaluated using the Medical Research Council Manual Muscle Testing Scale which is the most commonly accepted method of evaluating muscle strength[11]. In this method, the key muscles from the upper and lower extremities are tested against the examiner's resistance and the patient's strength is graded on a scale of 0 to 5, with grade 0 indicating no muscle strength and grade 5 indicating full power[12]. Here, after treatment, the muscle power showed improvement in both limbs. Before treatment, the right limb had decreased power against resistance which improved after the treatment. The left limb gained full power after treatment (Table 4).

Deep Tendon Reflexes are important parameters of neurological examinations used to assess the degree of facilitation of spinal cord centers[13]. In a normal person, when a muscle tendon is tapped briskly, the muscle immediately contracts due to a two-neuron reflex arc involving the spinal or brainstem segment that innervates the muscle[13]. It is graded from 0 to 4+. Grade 0 indicates hyporeflexia which is an absent or diminished response. Grade 2+ indicates a normal reflex in all except the knee where grade 3+ is normal. Hyperreflexia indicated by grades 3+ (except in knee) and grade 4+ refers to hyperactive or clonic reflexes[14]. The deep tendon reflexes were exaggerated in both the limbs before treatment. Also, both the ankles showed clonus. After treatment, the left limb showed normal reflexes except the ankle which still had clonus, but with reduced oscillations. (Table 5)

The performances in daily activities were measured using the Barthel Index which is a reliable measure of disability in people whose impairment interferes with independent motility and functions of daily living. It includes 10 common activities involving self-care and mobility [15]. Here, the total score of the Barthel Index showed an improvement from 35 before treatment to 60 after treatment. Improvements were seen in certain daily life activities. (Table 6). Prior to the treatment, the child was unable to feed himself. Afterwards, he could feed clumsily with a spoon and a little help from the mother. He was unable to dress himself before, but after the treatment, he was able to put on a dress with a little support from his mother. Previously he was completely dependent on the mother in using the toilet but after treatment needed slight assistance only. After treatment, he needed minimal or no assistance in transferring from bed to chair and back. He was unable to climb stairs before but could do so after treatment by holding onto the side rails.

Thus the improvement in his daily life activities is reflected in these changes. The reduction in spasticity and increase in muscle strength made the left limbs of the body become almost normal in function. By virtue of all of this, after the treatment, the extent of required assistance in performing the daily life activities of the child decreased considerably.

Table 3: Grading of Spasticity Using Modified Ashworth Scale

Body part		**Before treatment**	**After treatment**
Upper Limb	Right	3	2
	Left	1	0
Lower Limb	Right	3	2
	Left	1+	0

Table 4: Grading of Muscle Strength Using the Medical Research Council Manual Muscle Testing Scale

Body part		**Before treatment**	**After treatment**
Upper Limb	Right	3	4
	Left	4	5
Lower Limb	Right	3	4
	Left	4	5

Table 5: Deep Tendon Reflex Assessment

Reflex	**Before treatment**		**After treatment**	
	Right	**Left**	**Right**	**Left**
Biceps	3+	3+	3+	2+
Triceps	3+	3+	3+	2+
Knee jerk	4+	4+	3+	3+
Ankle jerk	4+	4+	4+	4+

Table 6: Assessment Using the Barthel Index

Activity	Before Treatment	After Treatment
Feeding	0	5
Bathing	0	0
Grooming	0	0
Dressing	0	5
Bowels	10	10
Bladder	10	10
Toilet use	0	5
Transfers (bed to chair and back)	5	10
Mobility (on level surfaces)	10	10
Stairs	0	5
Total Score	**35**	**60**

DISCUSSION

The condition of spastic cerebral palsy requires both internal and external interventions. Here on analyzing the case, it was found that the *Panchavayus*- the *Prana, Udana, Vyana, Apana* and *Samana*, the *Pacaka, Alochaka* and *Sadaka pitha,* and *Shleshaka, Tarpaka, Avalambaka kapha* were involved in the disease progression. The involvement of *Rasa, Rakta, Mamsa, Meda, Asthi, Majja dathus* was also seen. Hence there was the involvement of the *Sarva deham* with *Pravara roga bala* and *Avara rogi bala*. The *Vyadhyavastha* was *Puranam* and *Satwa* of the patient was *avara*. The child also had *Vishamagni.*

The treatment protocol followed was based on *Vatavyadi* treatment principle beginning with *Agni deepana* and *Anulomana*. Then *Bahya*, and *Abhyanthara snehana* was done, followed by *Swedana, Shodana* and *Brihmana* therapies.

The patient's *Agni* was hampered and so internal medicines given were given after ensuring *Agnideepthi.* Treatment began by giving *Vaiswanara choorna* to ensure proper *Agni*. Keeping in mind the *Utharothara dathu* and *Prabala vayu* involvement, *Rasneranadi kashaya* and *Balarishta* were selected. For *Anulomana* of *Vayu*, *Sukumaraeranda* and *Dhanwantharam* tablet were given*. Kalyanaka ghruta* and *Saraswatha choorna* were chosen due to the medicine action on higher mental functions.

External procedures were started with a *Rookshana* procedure of *Utsadana* with *Kolakulathadi choorna* and *Dhanyamla* which reduces the excess *kapha dosha*, thereby reducing *Aama* and by bringing about stability to the body. The medicine used *kolakulathadi choorna* is *Vatahara* in nature and further adding of *Dhanyamla* makes it more *vata* relieving. This was followed by *Snehana, Swedana* procedures which are pre-requisties of any process of *Shodana*. Also *Sneha- Sweda* procedure relieves the stiffness of joints. *Mahanarayana taila* which alleviates *Shakhasrita vata* conditions was used in *Bahya snehana. Swedana* was achieved by procedures like *Patra potala sweda* using *Vatahara* leaves. External oil applications on head, spine and eyelids were done throughout the treatment period to further bring about a *Sneha sweda* state of the whole body. On the limbs, stabilization in the form of *Upanaha,* which is one among the *Ashtaswedas* where medicines made to a poultice form is applied on the spastic joints, was done. As the involvement of *Masthishka* is of prime importance in the patient's condition, *Shirolepa* was also done. *Shodana* done was *Vasti* using *Dwipanchamooladi yoga* which has action on deeper *Dathus.* The course of treatment ended by a *Bhrimhana* procedure for the whole body which also nourishes the *Dathus*.

The physiotherapy performed in conjunction with therapeutic interventions helped the child's movements become much more stable. Speech therapy enabled the child to communicate better. After the treatment, he had decreased clarity in a few words only.

CONCLUSION

The management here has been done exclusively using Ayurveda medicines, appropriate *Panchakarma* procedures and supportive therapies. Remarkable improvements in the quality of life of the child was seen. Spasticity of all limbs reduced and the left limb became almost normal thereby rendering the child with an improved gait. The improvement in muscle strength and deep tendon reflexes also indicates a positive outcome of the treatment. He is able to walk a few steps without support and can climb stairs. He now has a near to normal speech. Thus highly significant improvement in the day-to-day activities of the child was noticed.

This shows Ayurveda is not only highly effective in managing spastic cerebral palsy but also imparts the person a better standard of living, thereby maximizing the individual's level of independence and enabling him a better survival in society. Ensuring the health of the mother and newborn and preventing all sorts of infections during the neonatal period is very important for the long term well being of both. Following practices like *Sootikacharya* explained in our classics could be very effective to prevent many of the puerperal infections.

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