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CASE STUDY

A Case Study on the Ayurvedic Managment of Spastic Cerebral Palsy Due to Birth Asphyxia

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Abstract

Background: Cerebral palsy is a disorder of motor control due to a static lesion of the developing brain. It was described almost 150 years ago. Global incidence of Cerebral Palsy is 2 to 2.5/1000 children but in Indian scenario, incidence is 03.8% of population. In India about twenty-five Lakh children are suffering from cerebral palsy. Most common type of cerebral palsy is spastic which cover 70% to 75% of overall. There is no exact correlation found for cerebral palsy in *Ayurvedic* literature but may be the result of *Shiromarmabhighata* (injury to brain) and can be considered as *Vata Vikara* or *Vata Vyadhi* (neurological disorders). **Aim:** To assess the effect of certain oral medication with *Purvakarma* (preparatory procedures) and *Panchakarma* procedures (Five-fold measures of Bio-cleansing) in the management of Cerebral Palsy (CP). **Material and Method:** In this case study, one case of Spastic cerebral palsy was registered and treated with multiple *Ayurvedic* treatment modalities. Total period of treatment was 93 days in which 5 days of *Abhyanga* (Massage) with *Nadi swedana* (steam kettle Sudation), 5 days of *Abhyanga* (Massage) with *Shashti Shali Pinda Swedana* (a type of Sudation) and then 7 days of *Matra Vasti* (Enema by Medicated oil in small dose) by *Ksheera Bala Taila*; this schedule of treatment was given three times with a gap of 14 days. *Vacha mula* (Root of *Acorus calamus*) and *Samvardhana Ghrita* was given as internal medication during the total course of treatment. Results were assessed by progress in delayed milestone, anthropometrical measurement, modified Ashworth scale, muscle power grading and Manual Ability Classification System (MACS) scale. **Result:** Treatment protocol of oral medication with *Panchkarma* delivered better result in CP patient, especially improving anthropometric data (weight, height, chest circumference), delaying milestone (walking and language), reducing spasticity and improved Quality of Life (QOL). **Conclusion:** Cerebral palsy is a disorder of motor function. The cause originates from the brain sometime during its developmental period. Internal medication along with *Purvakarma* (preparatory procedures) and *Panchakarma* (Five-fold measures of Bio-cleansing) give significant improvement in all the facets of spastic CP.

Keywords: *Abhyanga*, *Matra-Vasti, Samvardhana Ghrita*, *Vata Vyadhi*

1. Introduction

CP is motor function disorder and first described by William Little (1810-1894) in the 1840s[1]. Most important cause of chronic disability in children is CP[2] and making them physically handicapped, mentally handicapped and socially detached[3]. Cerebral palsy is linked with convulsion, abnormalities in language, visualization and intelligence due to hypoxia in developing brain[4], during prenatal, natal and postnatal period of life[5]. Global incidence of Cerebral Palsy is 2 to 2.5/1000 live births[6] but in India, incidence is 03.8% of the population[7]. Currently, in India about 2.5 million children are suffering from cerebral palsy[8]. The World Health Organization (WHO) estimates that, about 10 % of the overall population suffers from physical and mental disorder[9]. Indian data shows that 3.8% of the population suffers from various type of disability in India[10]. Almost 15-20 % of total

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physical handicapped children suffer from various type of cerebral palsy[11].

Motor disorders of CP are frequently associated with disorder of communication, behavior, sensation, perception and cognition. CP is divided into four types and most common type of cerebral palsy is spastic which cover 70% to 75% of overall cases[12]. Common causes of cerebral palsy are brain insult due to prematurity, birth asphyxia, hypoxic ischemic encephalopathy, meningitis and accidental head trauma. Modern medicine has no cure for any types or subtypes of cerebral palsy. Much newer advancement is being tried for treatment of cerebral palsy and associated features such as therapeutic hypothermia therapy[13], Botulinum toxin injection[14], Baclofen injection[15], hyperbaric oxygen therapy[16], selective dorsal rhizotomy[17], neuroplasticity[18] and stem cell transplantation procedure.

There is no exact correlation found for CP in *Ayurvedic* literature. However, in view of the etiology and clinical feature, Cerebral Palsy may be the result of *Shiromarmabhighata* (injury to brain) and can be considered as *Vata Vikara* (neurological disorders)[19,20]. Various conditions like *Phakka* (nutritional disorder)[21], *Pangulya* (locomotory disorders), *Mukatva* (Speech or language disorder), *Jadatva* (inability to do motor activities), *Pakshaghata* (hemiparesis), *Ekangaroga* (monoplegia)[22] *Sarvangaroga* (quadriplegia)[23] etc. exhibits signs and symptoms of Cerebral palsy where the main *Dosha* involved is *Vata*. Hence, CP should be treated on guideline of *Vata Vikara* or *Vata Vyadhi* (neurological disorders). In this case study, the effect of *Ayurvedic* therapy protocol for improving the condition of a spastic cerebral palsy patient was evaluated. The outcome of this clinical study will reveal further regarding the effect of these treatment modalities in the management of spastic cerebral palsy due to brain insult.

2. Case Report

2.1 Basic Information of the Patient

Age: 5 years

Sex: Male

Religion: Hindu

Socioeconomic Status (SES): Lower class.

Father has studied 10th standard and currently working as a security guard, mother is house wife.

2.2 Chief Complaints

- Unable to walk
- Spasticity of body
- Poor coordination
- All milestones are delayed since infantile age

2.3 History of Present Illness

A 5.0 years old male child brought by his parents to Kaumarbhritya OPD of Government Ayurvedic PG College Varanasi with above complaints. According to Patient baby was delivered by LSCS (lower segment cesarean section) prematurely, and suffered from Hypoxic Ischemic Encephalopathy (HIE) and neonatal jaundice. Spasticity and involuntary movement became noticeable after the age of 5 months and then parent started treatment by many allopathic doctors without any significant benefit. At the age of five years they approached us for further management.

2.4 History of Past

Hypoxic Ischemic Encephalopathy (HIE) grade-2 and neonatal jaundice.

2.5 Treatment History

Child was treated by many allopathic doctors and the treatment details are as mentioned below;

1. Anti-convulsant therapy for first 2 years (Phenobarbitone)
2. Tablet Baclofen for muscle relaxant.
3. Botox injection to reduce contractures.
4. Physiotherapy

2.6 Family history

Family history is not significant.

2.7 Birth History

At the time of delivery, age of mother was 21 years and has not suffered from any disease. According to patient,

baby was delivered by LSCS and indication of LSCS was fetal distress. Baby did not cry after birth and weak cry start after 24 hrs. Baby was shifted to NICU (Neonatal intensive care unit) for proper care and management. Data of APGAR score and resuscitation measures taken was not available. Baby was delivered prematurely (34 weeks) and at the time of birth weight of baby was 1.6 kg (low birth weight).

2.8 Vaccination history

Proper for age.

2.9 Personal History

Patient was totally dependent for food intake and activity. Patient was eating only semi solid food due to lack of coordination in deglutition. Appetite of patient was very poor and frequently suffers from cough and cold. Sleep was disturbed, bed wetting (not achieved bladder control) and drooling from the mouth since birth.

3. Examination

Vitals of patient were normal. Examination of cardiovascular system, respiratory system and gastro intestinal system had not shown any abnormality.

3.1 Central Nervous System (CNS) Examination

- Patient was hypertonic (spasticity) and suffers from mild contractures at ankle and knee joint.
- Muscle power was in grade one.
- Cranial nerve examination- Not done (Due to handicapped physical and mental state of the patient.
- Hyper-reflexia was present (Suggest upper motor neuron (UMN) injury which is main characteristic of cerebral palsy.
- Babinski sign - Present
- Meningeal signs - Absent (Neck rigidity, Kernig sign and Brudzinski sign were not present)

4. Investigations

CT scan and MRI were taken to identify anatomical abnormality in the region of brain. In this case impression of MRI is Spastic CP with sequels of HIE (Hypoxic ischemic encephalopathy).

5. Material and Method

In this case study one case of Spastic cerebral palsy was registered and treated with multiple *Ayurvedic* treatment modalities. Total period of treatment is 93 days in which 5 days of *Abhyanga* (Massage) with *Nadi swedana* (steam kettle Sudation), 5 days of *Abhyanga* (Massage) with *Shashti Shali Pinda Swedana* (a type of Sudation) and then 7 days of *Matra Vasti* (Enema by Medicated oil in small dose) by *Ksheera Bala Taila*. *Vacha mula* (Root of *Acorus calamus*) and *Samvardhana Ghrita* was given during the entire duration of treatment as internal medication.

6. Treatment Protocol

7. Criteria for Assessment

The assessment was done on the basis of improvement in delayed milestones, growth parameters, drooling

	Step - 1	Oral medication (Total 93 days)
1.	*Vacha-mula* (Root of *Acorus calamus*) (Duration=93 days)	❖ It was rubbed 40 times on a stone in 5 ml of cow's milk, ❖ Half a piece of wet almond also rubs with *Vacha Mula.* ❖ The product was mixed with 5 ml of honey and give orally to CP children.
2.	*Samvardhana Ghrita* (Duration=93 days)	❖ *Samvardhana Ghrita* was taken from standard pharmaceutical company of *Ayurveda.* ❖ *Samvardhana Ghrita* was prepared as per the recommendation of *Kashyapa Samhita*[24] by *Ghrita Paka* method[25]. ❖ The dose of *Samvardhana Ghrita* was decided by using the criteria of *Sharangadhara Samhita*[26].

Step - 2	***Purva-Karma*(preparatory procedures) (Total 10 days in each course of treatment)**	
1.	*Sarvanga Snehana* or *Abhyanga* (full body massage) with *Nadi Swedana* (steam kettle Sudation) (Figure 1) (5 days in each course)	• *Abhyanga* (Massage) with equal amount of *Bala Taila* and *Mahanarayan tail* in *Anuloma* (downward) direction[27] for 20 minutes (10 minutes in supine and 10 minute in prone position) • After that *Nadi Swedana* (steam kettle Sudation) for 20 minutes. • (10 minutes in supine and 10 minute in prone position) • Total time duration = 40 minutes but may vary according to season and strength of person
2.	*Sarvanga Snehana* or *Abhyanga* (full body massage) with *SSPS* (*Shashti Shali Pinda Swedana*) (Figure 2) (5 days in each course)	• Massage with equal amount of *Bala Taila* and *Mahanarayan tail* in *Anuloma* (downward) direction for 20 minutes (10 minutes in supine and 10 minute in prone position) • After that *Shashtika Shali Pinda Sweda* (SSPS), *Nadi Swedana* in *Anuloma* (downward) direction for 20 minutes. (10 minutes in supine and 10 minute in prone position) • Total time duration=40 minutes but may vary according to season and strength of person
Step – 3	***Pradhan-Karma* (main procedures) (Total 7 days in each course of treatment)**	
1.	*Matra-vasti* (Medicated oil enema in small dose) (Figure 3) (7 days in each course)	• *Matra-Vasti* (Medicated oil enema in small dose) by *Kshira-Bala Taila*. • To the patient *Ksheera Bala Taila vasti* was administered for 7 days duration in each course of treatment. • About 10 ml *Ksheera Bala Taila vasti* was administered to the patient with the help of disposable syringe which was connected to a disposable tube.

Fig.-1 Abhyanga with Nadi Swedana

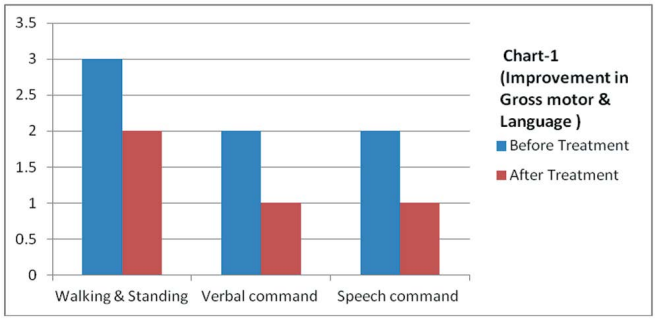
Fig. 2 Abhyanga with Shashti Shali Pinda Swedana

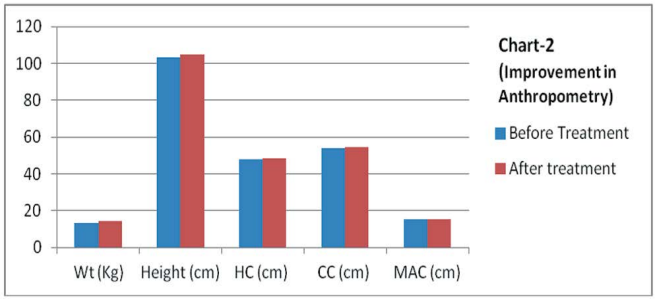
Fig. 3 Matra-vasti by Ksheera Bala Taila

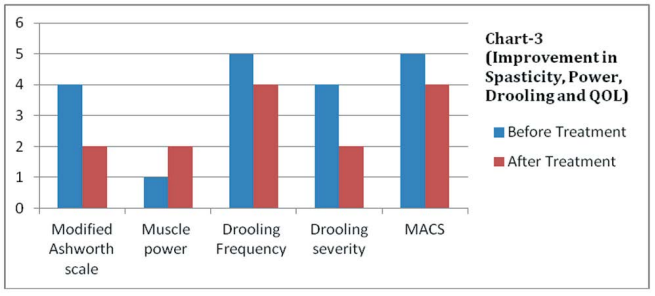
frequency and severity, muscle spasticity, power of muscle and QOL. Improvement in motor milestones assessment was done by milestone assessment criteria[28], growth parameters by anthropometry, drooling frequency and severity by drooling assessment criteria[29], muscle spasticity by modified Ashworth scale[30], Muscle power by MRC Scale[31] and QOL by MACS (Manual Ability Classification System) scale[32].

8. Result

Three courses (sittings) of treatment were completed in 93 days. After that significant improvement was found in all milestones such as speech (grade-2 to grade-1), verbal (grade-2 to grade-1) and able to walk with support (grade-3 to grade-2) (Chart 1). Weight, length, Head Circumference (HC), Chest Circumference (CC) and Mid Arm Circumference (MAC) was improved significantly (Chart 2) which indicates growth in patient. Muscle spasticity was reduced from grade-4 to grade-2 on modified Ashworth scale (Chart 3). Muscle power improved after treatment from grade-1 to grade-2 on Medical Research Council (MRC) Scale (Chart 3). Drooling frequency and drooling severity significantly improved after therapy (Chart 3). QOL was also improved in MACS scale (Chart 3).







9. Discussion

Cerebral palsy is a syndrome rather than single disease. Cerebral palsy mainly affects movement and posture which arise due to injury of fetal or infant brain[33]. The etiology of cerebral palsy can be thought of using the four P's: prematurity, prenatal, pen natal and postnatal. Birth asphyxia is cause of cerebral palsy in this case study and this is most common cause of cerebral palsy in another study also [34] Spastic CP is most common type and occurrence is about 70-75% of cases[35]. It is characterized by signs of upper motor neurons injury viz. hypertonia, spasticity exaggerated Deep Tendon Reflexes (DTR) and extensor plantar responses. Spastic cerebral palsy is of three types; quadriplegia, diplegia and hemiplegia. The studied case was spastic quadriplegia and it is secondary to hypoxic ischemic events.

There is no exact correlation found for cerebral palsy in *Ayurvedic* literature. However, in view of the etiology and clinical features, Cerebral palsy may be the result of *Shiromarmabhighata* (injury to brain) and can be considered as *Vata* dominant conditions or *Vata Vyadhi* (neurological disorders).

So the aim of treatment for CP was to pacify vitiated *Vata dosha*. In *Ayurveda*, *Snehana* (Oleation), *Swedana* (Sudation) and *Vasti karma* (Medicated enema) are main line of treatment for *Vata Vikara* or *Vata* related disorders (neurological disorders)[36]. In management of CP till now there is no successful treatment in modern pediatrics but in *Ayurveda*, by appropriate oral medication with *Panchakarma* procedures (Five-fold measures of Bio-cleansing) can be an effective method.

10. Effect of Oral Medication

In the form of oral medication *Samvardhana Ghrita* and *Vacha-mula* (Root of *Acorus calamus*) was given for 93 days continuously.

- ***Samvardhana ghrita***

Samvardhana ghrita contains *Kashaya rasa* (Astringent taste), *Madhura rasa* (sweet taste), *Lavana rasa* (Salty taste) and *Madhura vipaka* (Sweet-bio transformation or final outcome of digestion) which are opposite in property of *Vata*. Hence *Samvardhana Ghrita* helps in improving all parameters related to

physical and mental health of CP patients. *Samvardhana Ghrita* have *Guru-snigdha guna* (Quality or properties), *Brimhana* property (increase body weight naturally, boost immunity of body and rejuvenate body), *Medhya* property (improve memory with intellect) and *Tridosha shamaka* (suppress *Vata, Pitta* and *Kapha*) property which are of very helpful in treatment of CP[37].

- **Vacha Mula (*Roots of Acorus calamus*)**

Many studies have claimed that the *Vacha-mula* (roots of *Acorus calamus*) helps in subsiding neurological symptoms of brain[38–40] and also have positive effects on memory disorder[41]. Root of *Vacha* is very effective in improving grasping power, speech performance (language milestones)[42] and learning performance, by decrease brain lipid peroxide content[43]. Use of *Ayurvedic* medicine with honey enhances the potency and decreases its bitterness; thereby increasing its palatability[44].

- **Effect of Purva-karma (Preparatory Procedures)**

In total duration of treatment, *Purva-karma* (preparatory procedures) was done in three sitting with 14 days interval after each sitting.

- ***Sarvanga snehana / abhyanga* (Whole Body Massage)**

Abhyanga **(body massage) by oil** provides nourishment due to its *Snigdh*, *Mridu* and *Picchila Guna* (Oily, soft and sticky quality). *Vayu* resides in *Sparshnendriya* which is situated in *tvacha* (skin). *Abhyanga* (Massage) on skin directly works on *Vata* to shift to normalcy. *Bala Taila* and *Mahanarayan tail* both have *Vata shamak* (suppress *Vata*) property. When *Snehana* (Oleation) and *Swedana* (Sudation) are done together then *Dosha* deflect from *Shakha* (peripheral system comprising blood, tissues, skin and *Rasa* (plasma) to *Koshta* (hollow organs and cavities of body or complete digestive system) and then *Koshta dosha* managed by *Vasti karma* (Medicated Enema). When *Vata* comes to normalcy then delayed milestones will shift to normal state[45]. *Abhyanga* (Oleation) manages hypertonic condition, improves muscle bulk and power in Cerebral palsy[46].

- ***Nadi Swedana* (Tube Sweating)**

Swedana (Sudation) after *Abhyanga* (massage) help to remove *Aavarana* (obstruction of normal movement or hampered normal movement) and *Srotorodha* (Obstruction of channels). *Swedana* (Sudation) is very helpful in relieving muscle spasticity, improves joint movement and Range of Motion (ROM).

- ***Shashtika Shali Pinda Swedana* (SSPS)**

Shashtika Shali Pinda Sweda is a *Brimhaniya Snehika Swedana* (A type of sudation) performed by *Shashtika Shali* (*Oryza Sativa Linn*) with *Dashamula* decoction and milk. It has *Kapha-Pitta-Vata shamak* properties[47]. *Shshtika Shali* rice has the *Snigdha* and *Laghu guna* (oily and light-ness property) and *Brihana Karma* (Anabolic function), So SSPS is very useful in malnutrition of limbs. SSPS enhances physical consistency and increases the muscular strength.

- **Effect of *Pradhan Karma* (Main Procedures)**

During total duration of treatment *Matra-vasti* (Medicated oil enema in small dose) was done in all three sitting and 7 days in each sitting.

- ***Matra-Vasti* (Oil Enema in Small Dose)**

Vasti is most important *Pradhan-karma* to manage the *Vata Dosha* in treatment of Cerebral palsy. Short chain fatty acids of medicated oil reaches rectum, colon and direct diffusion property from epithelial cells to blood capillary where it shows generalized effect[48]. *Vasti* is restricted till the crawling age but *Anuvasana vasti* (oil enema) can be given from early infancy. *Matra-vasti* is having *Balya* (strengthening), *Brimhana* (nourishing) and *Vatarogahara* property. *Matra-vasti* provides nourishment to deeper tissues[49]. *Ksheera Bala Taila vasti* mainly improves motor functions such as sitting, standing, crawling and walking in cerebral palsy patients. Fine and gross motor functions of cerebral palsy were improved by *Vasti karma*. *Matra- Vasti* found beneficial in spastic diplegia[50].

11. Total Effect of Therapy

Total effect was found near 15-20% improvement and this improvement helps the patient to improve QOL. Previously it was believed that neurons do not repair after any injury, but the new concept of neuroplasticity has mentioned that CNS have the ability to repair their

neurons by axonal budding to take over the function of injured neurons. This improvement in cerebral palsy patients also supports the new concept of neuroplasticity.

12. Conclusion

Cerebral palsy is a multi-factorial disease. *Ayurveda* consider cerebral palsy as *Vata-Vikara* or *Vata-Vyadhi* (neurological disorders), occurring as a result of *Shiromarmabhighata* (injury to brain). The preferred treatment protocol is effective in reliving the symptoms of cerebral palsy patient. Combination of oral medication (*Vacha mula* and *Samvardhana Ghrita) Purva-Karma* (*Abhyanga* by equal amount *Bala Taila* and *Mahanarayan* along with *Nadi Swedana* & *Shashti Shali Pinda Swedana)* and *Pradhan-Karma* (*Ksheera Bala Taila Matra-vasti)* was very effective for spastic cerebral palsy due to birth asphyxia.

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