

Scope of *Ayurveda* in Cerebral Palsy

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Abstract

Cerebral palsy (CP) is the leading cause of childhood disability affecting function and development. It is defined as a non-progressive neuromotor disorder of cerebral origin. The motor disorders are often accompanied by disturbances of sensation, perception, cognition, communication, and behaviour as well as by epilepsy and secondary musculoskeletal problems. The condition poses considerable therapeutic challenge to the treating physician. Currently there is no specific treatment available in modern medical science to counteract the brain insult leading to motor dysfunction in CP. There is no single disease or condition explained in our classical texts regarding Cerebral Palsy. Classical signs and symptoms of CP will fit into criteria of *Vata vyadhi* (*Vata* predominant disease). Hence *Vatavyadhi chikitsa* will prove beneficial. Overall goal of treatment is to help the individual with cerebral palsy reach his or her greatest potential physically, mentally, and socially. It is to improve the quality of life by establishing optimal independence. Various *panchakarma* procedures, mainly *udvartana*, *abhyanga*, *shastikshalipindasweda*, *shirodhara* and *matrabasti* along with oral herbal drugs containing ingredients with *medhya*, *balya*, *brimhana* and *vatahara* properties would bring out normalcy of *vata* including other associated *doshas*, providing better nourishment to *dhatu*s and improving cognition deficit in CP affected children.

Key words: cerebral palsy, neuromotor disorder, *Ayurveda*, *panchakarma* procedures, oral herbal drugs

Introduction

Disabled children are of great concern to the family as well as the society. Cerebral palsy (CP) is the leading cause of chronic disability in children. CP is a diagnostic term used to describe a group of permanent disorders of movement and posture causing activity limitation that are attributed to non-progressive disturbances in the developing foetal or infant brain. The motor disorders are often accompanied by disturbances of sensation, perception, cognition, communication, and behaviour as well as by epilepsy and secondary musculoskeletal problems. CP is caused by a broad group of developmental, genetic, metabolic, ischemic, infectious, and other acquired aetiologies that produce a common group of neurologic phenotypes. CP has historically been considered a static encephalopathy, but some of the neurologic features of CP, such as movement disorders and orthopaedic complications, including scoliosis and hip dislocation, can change or progress over time.

The condition poses considerable therapeutic challenge to the treating physician. Currently there is no specific treatment available in modern medical science to counteract the brain

insult leading to motor dysfunction in CP. The available therapeutic interventions are mostly symptomatic and costlier.

Cerebral palsy cannot be correlated with any single disease or condition mentioned in *Ayurveda*, as it is a multi-factorial disease. *Vatavyadhi chikitsa* will more beneficial in these cases, because classical signs and symptoms of CP resembles with criteria of *Vata vyadhi* (*Vata* predominant disease). Overall goal of treatment is to help the individual with cerebral palsy reach his or her greatest potential physically, mentally, and socially. It is to improve the quality of life by establishing optimal independence.

History of cerebral palsy

William Little, a British surgeon in the 1860s first identified Cerebral Palsy then known as ‘Cerebral Paralysis’. He raised the possibility of birth asphyxia as a chief cause of the disorder. Sigmund Freud in 1897 suggested that difficult birth was not the only cause but rather only a symptom of other factors on the foetal development. Modern research has shown that 75% of cases were not due to birth asphyxia supporting Freud’s view even though through the 19th and 20th Centuries Little’s view was the accepted explanation.

Epidemiology

Incidence of Cerebral palsy in multiple births is 7.5/1000 live births and in Singletons it is 2.1/1000 live births and, more in 1500grams or less is 80/1000. 10% of the global population has some form of disability due to different causes, In India, it is 3.8% of the population. Nearly 15-20% of the total physically handicapped children suffer from Cerebral palsy. In India, the estimated incidence is around 3/1000 live births.

Classification of Cerebral Palsy and major causes

Motor syndrome (approx. % of CP)	Neuropathology/MRI	Major causes
Spastic diplegia (35%)	Periventricular leukomalacia Periventricular cysts or scars in white matter, Enlargement of ventricles, squared of posterior ventricles	Prematurity Ischemia Infection Endocrine/metabolic (e.g. thyroid)
Spastic quadriplegia (20%)	Periventricular leukomalacia Multicysticencephalomalacia Cortical malformations	Ischemia, infection Endocrine/metabolic, genetic/developmental
Hemiplegia (25%)	Stroke: In utero or neonatal Focal infarct or cortical, subcortical damage Cortical malformations	Thrombophilic disorders Infection Genetic/developmental Periventricular hemorrhagic infarction
Extrapyramidal (athetoid, dyskinetic) (15%)	Asphyxia: symmetric scars in putamen and thalamus Kernicterus: scars in globuspallidus, caudate, putamen, brain stem No lesions: ?dopa-responsive dystonia	Asphyxia Kernicterus Mitochondrial Genetic/metabolic

Clinical features

The hallmark of the condition is motor dysfunction, comprising of abnormal muscle tone (hypertonia more often than hypotonia), abnormal posture (decerebrate, decorticate, or flaccid), and disorder of movement. Deep tendon reflexes are always brisk and planters are up going.

As the child grows, the movement disorder can appear worse because every effort to move is confronted by the force of gravity. The clinical expression of the case depends on the extent and area of brain damage, growth of the child, and co-existing developmental problems.

Associate manifestations and complications

- Seizure Disorders (fits) 33% - 50%
- Mental Retardation 50% - 70%
- Learning Disorder 60% - 70%
- Attention Deficit Hyperactive Disorders/ Behavioural problems
- Speech deficits/ shallow breath
- Dysarthria - 50%
- Visual Impairments 40% to 50%
- Auditory Impairments 25% to 40%
- Feeding difficulties – swallowing problems, mouth closures, tongue moments
- Bladder and bowel dysfunction
- Sleep disturbances
- Orthopaedic abnormalities – hip or foot deformities, contracture at joints, scoliosis etc.

Differential Diagnosis of CP

- Genetic syndrome (i.e. Hereditary spastic diplegia)
- Metabolic disease (i.e. Mitochondrial pathology)
- Syndrome with vascular defect (i.e. Moyamoya disease)
- Neuromuscular disease
- Neural tube defects
- Neurodegenerative disease
- Muscle disorder (i.e. muscular dystrophy)
- Paraplegias, quadriplegias due to trauma

The Gross Motor Function Classification System (GMFCS)

This is a recently developed system which has been found to be a reliable and valid system that classifies children with cerebral palsy by their age-specific gross motor activity. The GMFCS describes the functional characteristics in five levels, from I to V, level I being the mildest in the following age groups: up to 2 years, 2-4 years, 4-6 years and between 6 to 12 years. For each level, separate descriptions are provided. Children in level III usually require orthoses and assisting mobility devices, while children in level II do not require assisting mobility devices after age 4. Children in level III sit independently, have independent floor mobility, and walk with assisting mobility devices. In level IV, affected children function in supported sitting but independent mobility is very limited. Children in level V lack independence even in basic antigravity postural control and need power mobility.

Diagnosis

- A thorough history and physical examination should preclude a progressive disorder of the CNS, including degenerative diseases, metabolic disorders, spinal cord tumour, or muscular dystrophy.

- An MRI scan of the brain is indicated to determine the location and extent of structural lesions or associated congenital malformations; an MRI scan of the spinal cord is indicated if there is any question about spinal cord pathology.
- Genetic evaluation should be considered in patients with congenital malformations (chromosomes) or evidence of metabolic disorders (e.g., amino acids, organic acids, MR spectroscopy).
- Tests to detect inherited thrombophilic disorders may be indicated in patients in whom an in utero or neonatal stroke is suspected as the cause of CP.
- Additional studies may include tests of hearing and visual function.

Because CP is usually associated with a wide spectrum of developmental disorders, a multidisciplinary approach is most helpful in the assessment and treatment of such children.

Management

A multidisciplinary approach is essential. A physician should have an elementary idea of all the modalities required for holistic management. This includes physiotherapy and motor training, training in activities of daily living, management of feeding difficulties, and early developmental stimulation.

- Developmental stimulation is the key to management and includes: visual stimulation, tactile stimulation, auditory stimulation, and sensory stimulation, head movement, holding head and babbling.
- Educational problems, visual problems and communication problems need to be addressed.
- Treatment of epilepsy and drug treatment of spasticity should be instituted when indicated.
- Good family support is the key to success in rehabilitating a child with cerebral palsy.

Measures Initiated for Prevention and Early Identification

Since causes of CP in most cases are not clearly known, it is difficult to apply preventive measures. Prevention of maternal infection, foetal or perinatal insults, good maternal care and freedom from postnatal damage can reduce prevalence. Recent evidence points that asphyxia at birth may be a manifestation of poor establishment of respiration in a brain damaged child and is not always an etiological factor. Early diagnosis, prompt adequate management plans can reduce the residual neurological and psychosocial emotional handicaps for the child and his family.

Ayurvedic approach towards CP

For detailed description of the disease CP, though, there is no one to one correlation is available in *Ayurvedic* classics, but nearer conditions and some causative factors linked to etiopathology for such type of disease condition, are described very clearly in many chapters in different texts. Some conditions found discrete in classics at different places like *Phakka*, *Pangulya*, *Mukatva*, *Jadatva*, *Ekanga Roga*, *Sarvanga Roga*, *Pakshaghata*, *Pakshavadha* etc. under the group of *Vata Vyadhi*. Contributory factors like inappropriate *Ritu*, *Kshetra*, *Ambu* and *Bija*, *Dauhrida Avamanana* (negligence of urges during *Dauhrida* stage of pregnant women), presence of *Garbhopaghatkarbhava*, incompatible *Garbha Vriddhikarabhava* and improper following of *Garbhini Paricharya* may have undesirable effects on the foetus in utero. More over *Akala Pravahana* during labour, *Shiromarmabhighata*, defect in *Prana Pratyagamana* process, *Ulbaka*, *Nabhi Nadi Vikara*, *Graha Roga*, improper *Shishu Paricharya* etc may play role as causative factor, during and after birth. These are the factors said responsible for hampering the normal growth and development of child and thus reason for causing many diseases, deformities and even death.

However considering the classification and individual features of Cerebral Palsy, it can be taken as nearer condition of *Vata Vyadhi* or *Vata Vikara* or *Vata* predominant condition. A Comparison of classification of Cerebral Palsy and *VataVikara* can be made as below described ways.

- *Ekanagavadha* - Monoplagia
- *Pakshavadha* - Hemiplegia/Hemiparesis
- *Sarvangaroga* - Quadriplegia
- *Pangu* - Diplegia
- *Saada* - Floppiness/Hypotonic CP
- *Chestavridhi* - Abnormal movement, Ataxic
- *Chalatra* - Athetosis, Dyskinetic type

Associated conditions in Cerebral Palsy

- *Mukatva* - }
- *Vakasanga* - } Speech or language disorders
- *Badhirya* - Hearing impairment
- *Akshivyudasa* - }
- *Bhravyudasa* - } Visual impairment/abnormality
- *Sankocha* - Contracture
- *Khanjata* - Gait abnormality, limping while walking
- *Aakshepaka* - Seizure/Convulsion/Muscle spasm
- *Dandaka* - Opisthotonus posture in severe degree quadriplegic
- *AnavasthitaChittatva* - Impaired mental function/instable mind

Management

Vata is responsible for psychological activities such as enthusiasm, concentration etc. and exhibits several kinetic and physiological activities like respiration, circulation, voluntary action etc. *Vata* is the only principle having predominance of *Vayumahabhuta* and its main *lakshana* is *gati* (movement) and *gandhana* (knowledge perception), which are generally attributed to nervous system of contemporary science exhibiting the same functional properties. Since CP is a non-progressive neuromotor disorder of cerebral origin associated with seizures and other intellectual impairments, the aim of treatment should be that of *vata shaman*. As *Shira* forms the *Rogadhishthana*, it should be given prior importance while planning treatment.

Use of *Rasayanas* having *Medhya* (intellect promoting) properties will improve the mental and physical growth of the child. This will help to cure and prevent the disabilities to a good extend.

The importance of controlled exercises should be highlighted in the management protocol as *Vyayama* will create lightness to body, trigger immune functions, improve oxygen delivery throughout the body, increase blood supply to muscles, increase flexibility and strength of muscles, improve the range of joint movement, produces stronger bones, ligaments and tendons enhancing the posture, poise and physique.

Various panchakarma procedures are shown to be beneficial in motor dysfunction of CP. Main procedures are *Udvardana*, *Abhyanga*, *Shashtikashalipindasweda*, *Shirodhara* and *Matra basti*.

External Medication

Udvardana : It is a procedure in which powder of various plant part are massaged over the body. Among the *Shadupakrama* of *Charaka Samhita*, *Rukshana* is having its importance in removing *Aama* from micro and macro channels. *Udvardana* is one of the methods to do *Rukshana* of the body to remove obstruction from the *Srotas*. *Udvardana* can be of two types-
1. *Ruksha* 2. *Snigdha*.

CP is considered as a *Vata Vyadhi* in which *Vata* is become *Aavarita*(getting covered) by vitiated *Kapha* at the site of *Mastulunga* which is again the natural site of *Kapha*. So to remove the *Srotorodha* and to open the channel *Ruksha Churna* (*Yava, Kulattha*etc) *Udvartana* should be done prior to all other procedures.

Abhyanga :*Snehana* has more importance while treating *Vatika* disorders. The *Kshina* (undernourished) *Dhatus* easily get nourished by the *Snehana* therapy. *Snehana* can be external (*Bahya*) as well as internal (*Abhyantara*). *Abhyanga* comes under *bahya snehana*. It is the process of application of oil over the whole body with light massage. *Abhyanga* is explained in curative as well as preventive aspects by means of a daily procedure in *Dinacharya*, in all seasons and from childhood till old age. In this context the main part of *abhyanga* procedure is the mechanical stimulation more precisely the pressure application during massage therapy. Pressure application done in proper way can help in reduction of motor neuron hyper excitability.

Shashtikshalipindasweda : *Shashtikshalipindasweda* is one of the thirteen types of *sagnisweda* which comes under *pindasweda*. Further it comes under *snigdha* type of variety due to *snigdha* property of the material used in this procedure and this is indicated in *vata vyadhi* or *vata* dominant conditions. In this procedure fomentation carried out by the application of *pinda* (bolus containing medicine) on the body with gentle massaging by it. For the preparation of bolus *shashtik* rice is used. *Shashtikshali* is a special variety of rice which gets matured in sixty days. This is the reason for naming as *shashtikshalipindasweda*. Here *shali* means the rice of *shashtik* variety, *pinda* means the bolus and *sweda* stands for fomentation.

Shashtikshalipindasweda enhances physical consistency, strengthens the nervous system and improves the overall appearance of the skin. This is a strengthening fomentation employed in neurological disorders, malnutrition of limbs, arthritis and other many diseases.

Shirodhara : Continous pouring of a liquid like decoction, medicated milk, *tila taila* etc on the forehead and allowing it to flow over scalp using a special instrument called *dhara* pot for a specific time is called *shirodhara*. *Shirodhara* is a purifying and rejuvenating therapy designed to eliminate toxins and mental exhaustion as well as relieve stress and any ill effects on the central nervous system. Thereby controlling seizures, cognitive impairment and behavioural problems like anxiety, attention deficit hyperactivity disorder etc.

Matra Basti : *Basti chikitsa* is very helpful in pacifying *vata dosha*, further it is glorified that *basti chikitsa* as ‘*Ardha Chikitsa*’ or ‘*Purna Chikitsa*’. By these facts, *basti chikitsa* is most important among the *panchakarma* in the treatment of CP. *Matrabasti* is a type of *Snehabasti*. It is termed so because of the dose of *sneha* used in it is very less as compared to the *snehabasti*. *Matrabasti* is useful in patient of *vatic* disorder, who is extreme weak and exhausted by physical work. The main benefit of this *basti* is harmless and not generates any complication.

Internal medicines: Medicated *Ghrita* is the best option for internal medication in neurological diseases like CP. Because –

Medicated *ghrita* in the form of lipid soluble drugs are rapidly distributed throughout the intra and extra cellular spaces of the body, thus acts quickly.

These drugs are rapidly absorbed from the gut because of their lipid solubility and crosses blood brain barrier (BBB) due to its lipophilic nature and diffuse into the CSF and brain. Therefore any drug given in the form of *Ghrita* will not only be absorbed fast, but will also be able to reach some of the most distant and difficult to reach areas like the CNS.

An antioxidant property of *Ghrita* prevents the oxidative damage of brain and other tissues of the nervous system, thus providing protection from various degenerative diseases.

Ghrita has distinctive property of *Samskaranuvartana* i.e. there is no other such material which imbibes the quality to the extent that *Ghrita* does. It is *Yogavahi* so it carries active principles of the drugs to increase the potency of the compound drug.

Some of these *ghrita* preparations are-

- *Ashtangaghrita* - It is described by *Acharya Vagbhata*. It is mentioned for *Vaka*, *Medha*, *Smruti*, *Buddhi* enhancement.
- *Kalyanakaghrita* – It is described by *Acharya Vagbhata* in *unmad pratisedha*.
- *Samvardhanaghrita* - It is described by *Acharya Kashyapa* in *Lehadhyaya*. It is mentioned for the rapid growth of healthy child and treatment of *Pangu* (Lame), *Muka* (Dumb), *Ashruti* (Deaf) and *Jada* (Mental deficient / Idiot) child.

Medhya churna

Following *Medhya* (nootropic) drugs can be used;

- *Brahmi*
- *Vacha*
- *Sankhapushpi*
- *Guduchi*
- *Yashtimadhu*

Conclusion

CP is a chronic motor disorder that various efforts failed to prevent its occurrence. In most cases the cause is unknown. Children with CP suffer from multiple problems and potential disabilities such as mental retardation, epilepsy, feeding difficulties, vision, and hearing impairments. No effective treatment for the underlying brain damage has been formulated till date. There is no similar disease or symptom complex in *Ayurvedic* science that can be taken as synonym of CP. Based on etiology, pathology and clinical manifestations of CP, it can be considered as *Vata* dominant conditions. Hence the principle of treatment mainly leads towards management of *Vata Vyadhi*. Treatment of *Vata dosha* consists of a variety of treatment modalities including *Snehana (abhyanga)*, *Swedana (shashtikshalipindasweda)*, *Basti (matrabasti)* etc. *panchakarma* procedures. These procedures are found helpful in improving disease condition along with oral herbal drugs (such as *medhya* drugs) to improve cognitive and intellectual impairments in CP patients.

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