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Impact of cerebral palsy outline: A research review

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Abstract

Cerebral Palsy identifies a category of chronic movement and posture development disorders that involve impairment of activity, which are developed in the foetal or infant developing brain. It is understood that the possible causes of CP arise in the prenatal stage of development and the perinatal or natal phase, and the postnatal or post neonatal phase associated with congenital issues. It is the result of permanent static cerebral motor cortex lesion that occurs before or within 2 years of birth. While the lesion does not alter itself, the clinical symptoms shift as the child grows and develops. CP is the result of chronic static cerebral motor cortex lesion that occurs before or within two years of birth. Although the lesion does not alter itself, the clinical symptoms shift as the child grows and develops. The removal of spasticity helps many patients with CP to more easily and reliably use what selective motor ability they possess. CP associated spasticity can lead to complications of the musculoskeletal system such as contractures, pain, and subluxation. Related cognitive disorders result from the motor dysfunction.

Keywords: brain stroke, weakness in children, congenital issues

Introduction

It was first described in 1861 by William Little and it was known as the Little disease and was considered a static encephalopathy historically. The injury occurs perinatal and although the causes are poorly known, it is normal in premature infants with low birth weights and occurs in 2 to 3 out of 1000 live births and has heterogeneous consequences, systemic involvement and functional impairment, including lifelong motor changes, gestures, and the occurrence was associated with gestational age and birth weight.

Cerebral Palsy identifies a category of chronic movement and posture development disorders that involve impairment of activity, which are developed in the foetal or infant developing brain. CP is characterised by the inability to regulate motor functions which can have a detrimental impact on a child's overall growth by impacting the ability of the child to explore, communicate, learn and become independent.

Signs and symptoms (the child is around 1 to 2 years of age) include: children with serious brain lesions are typically diagnosed on the basis of neuroimaging such as ultrasonography and MRI shortly after birth and can therefore benefit from very early intervention, mental retardation, speech and language and oromotor disorders, delay in motor functions, delay milestones ^[1].

Causes

Prenatal/Antenatal

During Pregnancy there are certain causes which affect the child

- a) Drug Toxicity- steroids, Antihypertensive drugs
- b) Intra-uterine virus infection- which leads to severe brain damage
- c) Hypoglycemia
- d) Trauma to the mother
- e) Malnourishment
- f) Exposure of the mother's visceral area to repeated X-ray radiation
- g) Smoking, alcoholism, stress may also cause CP.

Natal/Neonatal

- a) Prematurity
- b) Vascular causes

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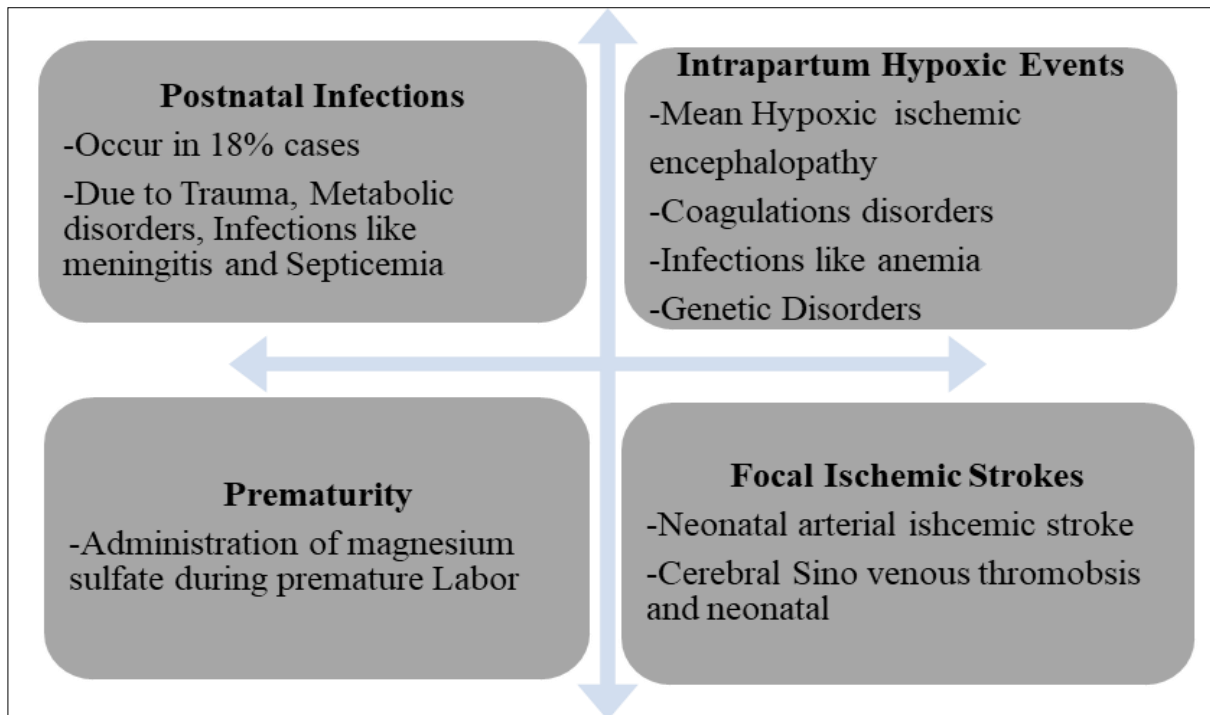


Fig 1: Etiology

Types of cerebral palsy

It is classified into main four types:

- Spastic CP (Stiff and Difficult movement)
- Athetoid CP (Uncontrolled movement)
- Ataxic CP (Disturbed Balance and Proprioception)
- Mixed CP (Combination of any above mentioned CP)

Hemiplegia

It is notable that the upper limb is generally more affected than the lower limb, on one side of the body. Disorders of the brain, deficiencies in the visual field, astereognosis and impairment of proprioception are probable. Hemiplegia is present in 22 percent of children with spastic CP. For certain cases the cause is a focal neurological, vascular, or infectious lesion. Through magnetic resonance imaging can be shown a unilateral brain infarction with post-hemorrhagic porencephaly [2].

Diplegia

The lower limb is involved. Kids with spastic CP have diplegia in 55 percent. When more babies with a low birth weight survive, diplegia is becoming more common. MRI shows strong periventric leukomalacia.

Quadriplegia

It includes all four arms, spine, and muscles that regulate the jaw, tongue, and pharynx, and the term trioplegia is used where one upper extremity is less active. Thirty per cent of children with spastic CP suffer from quadriplegia. For premature babies more severe involvement of the lower extremities is normal. Others have ischemic encephalopathy in the perinatal hypoxic phase.

Dyskinetic CP

Communication and causes the listener to believe that the child has an intellectual disability. Dysfunction with the sensorineural hearing often impairs communication. Dyskinetic CP constitutes between 10 to 15 percent of all CP cases.

Ataxia CP

Ataxia is a lack of balance, coordination, and power over small motors. Ataxic children have no ability to control their movements. Children who are able to walk will be having a wide-based gait and a dysmetria.

Mixed CP

Children with a mixed form of CP are usually experiencing moderate spasticity, dystonia, and/or athetoid.

Table 1: Clinical features, signs and symptoms, impairments

Antenatal	Perinatal	Post-natal
Maternal infection, TORCH -2-3RD tri, Vascular events MCA inftract, Metabolic disorder, Maternal ingestion of toxins, Rare genetic syndrome, Rh incompatibility.	Obstructed labor, Cord prolapse, Breech delivery, Hemorrhage, Hypoxic ischemic Encephalopathy, Hypoglycemia, Hyperbilirubinemia, Infection.	Acquired up to 3 yrs, Infection (meningitis, septicemia) Injuries, shaken baby syndrome, Trauma, Metabolic disorders.

From table 2 is showing the clinical features, signs and symptoms, impairments in antenatal, perinatal and natal stages.

Delayed motor milestones, irregular neurological study, persistence of primitive reflexes and irregular postural responses are the key symptoms that can collectively contribute to a CP diagnosis [3].

Clinical features

In 1st few month child with brain damage may show the following symptoms

1. Low muscle tone
2. Abnormal Posture
3. Lethargy
4. Shivering of limbs
5. Abnormal reflexes
6. Seizures and Bad feeding competence

During 6 months signs include muscle tone to change step

by step from low to high tone. There may be irregularity of movements from one side of the body to other. As the child grows it may appear slow developmental milestones, e.g. sitting up, rolling over, crawling, walking and talking. Developmental delay means child is retard then normal developmental progress e.g. rolling, walking, and crawling. There will be tenacity of primitive reflexes. Child may have behavioral changes like irritable, colic and Jittery. Speech and language disorder are common in CP condition.

Differential diagnosis

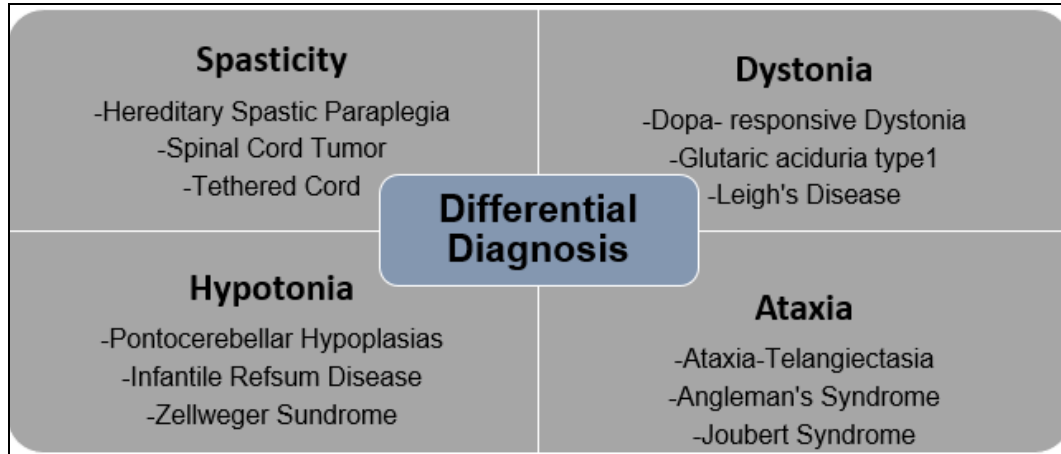


Fig 2: Showing differential diagnosis

Developmental milestones

Children develop abilities in five stages of development, as follows

Cognitive development

Children learn to solve problems at this level, to acquire knowledge and skills that help them think about and understand the world around them. A nine-month - old baby listening to his mother singing to him or a five-year - old boy, for example, learns to solve basic math problems [4].

Social and emotional development

Children are able to understand who they are, what they feel, how to begin to communicate with others, learn about relationships and convey emotions at this level. A nine-month - old infant, for instance, smiles, waves to someone, or a five-year - old kid notices someone who is upset and asks them if they're all right.

Speech and language development

Children acquire the ability to understand and learn the sounds of their native language at this level, and follow a natural progression to master language skills. For instance, a twelve-month-old child who says his/her first words, a two-year - old child who names the parts of the body or a three-four-year - old child who learns vocabulary and understands simple grammar.

Fine motor ability development

Children learn to use their tiny muscles at this stage, such as the muscles in their hands, fingers, and wrists. They learn to pick up certain things, keep something in hand, use a pencil to sketch, button shirt, or comb hair, for instance [5].

Gross motor ability development

Children learn to use large muscles, such as arms, legs, and torso muscles, at this stage [6].

Table 2: At birth to five-year achievement of developmental milestones chart [7-8]

Age	Gross motor	Fine motor	Speech-language	Cognitive	Social-emotional
New born	Uncoordinated, reflexive movement Flexed posture	Hand grasp Hands fisted near face	Listens to sound Cries Smiles to voice	Turns to visual stimulus, colours, voice, repeats motion to recall them, physically explores the world to learn about it.	Cries when infant cries Discriminates mother's voice
2 months	In prone, head up 45°, chest up in prone	Hands opened most of the times, holds hands	Gurgles, vowel-like noises	Follows moving object such as toys, recognizes familiar people	Awake more during day Responds to voice and smile
4 months	Uses arms to prop front to back with trunk support Rolls	Brings together hands in midline clutches at Supine Touches clothing and grabs rattle	Coos Laughs out loud	Watches hands Brings hands to the mouth Interested in environment	Learns to trust in self, Calms when spoken to, smiles at pleasurable sight Enjoys eye contact Self-soothes to sleep, stops crying at parents voice
6 months	Pulls to sit, sits tripod In prone position bears	Keeping a cube in two hands, keeping one cube in	Looks at the person talking to him Listens and	Imitates sound Bangs objects together, places	Facial expressions of emotion eye contact;

	weight on one hand	each hand, reaching out with one hand	vocalizes when adult stops, smiles at mirror	hands on bottle Looks for dropped object	shares enjoyment Prefers familiar people, stranger anxiety
9 months	Roll both ways Seats well, crawls Stands on hands and feet, moves of bears (straight all four limbs)	Radial-digital grip touches, moves, bangs two cubes together	Says "Mama" Imitates sounds inhibits to 'no'	Discriminates between parents and others, Searches for hidden toy Bites, chews cookie	Uses sounds to get attention, recognizes familiar people visually
12 months	Gets to rest, crawls with one hand held Catches rolling ball Stands well Walks	Pincer grip Voluntary cube lock and release Holds pencil, glass, two cube tower attempts	Points to get desired object, Turns to name, understands commands Uses gestures with vocalizing, reaching Socializes by playing games imitate clapping, bye-bye	Start of symbolic thought Points to images in a book Searches for hidden objects Receptive language	Stubborn.
18 months	Stands independently, walks alone, walks well with railing up and down stairs, throws ball when standing	Inserts shapes Makes four-cube tower Scribbles fistful Self-feeds	Uses few words with gestures, points to six body parts Claps from excitement, hugs, imitates environmental sounds	Imitates using actual props (broom sweeps, hammer bangs) Removes clothing Brushes own brushed hair Moves without adults in the house	Engages in play with others Uses self-calming transitional object Temper tantrums
24 months (Two years)	Runs, jumps, ascends and descends staircase with both the feet on one step without railing, kicks, Throws ball overhand	Makes vertical line "train" of cubes Uses spoon, helps dress Imitates circle and horizontal line	50 words, two-word phrases	Symbolic representation, using more complex toys and recognising the series of toys being placed together, puzzles	Feel trust when they're "nice" and shame when they're "poor" Parallel play 'No', 'Mine'
36 months (Three years)	Single leg stance for 3 seconds Pedals tricycle	Uses spoon well, drinks from cup, horizontal line, circle, cuts with scissors (awkwardly)	Uses 200 + terms, Three to four word phrases 75% intelligibility Calls sections of the body through usage	Put on shoes without laces, unbuttoning the shirt, counts two things, sorts shapes, independent feeding, pours liquid from one bottle to another	Initiates interactions with peers, shares Role play (e.g., 'home', 'doctor') Understands rules Fears imaginary stuff
48 months (Four years)	Balances for 4-8 seconds on one foot Hops Standing Broad Jumps: 1-2 feet Walks back in line	Square copies Cuts paper in half, circle cuts Dresses Ties single knot Writes first name part Imitates gate with cubes	Uses 300-1,000 words Say storeys 100% understanding, Word play, jokes, teasing, jokes	Bowel Wash, face wash and brushes teeth alone Uses fork well Self-talks to solve problems Counts four things, recognises opposites	Has a preferred friend Understands self-goodness, grief, anxiety and rage Provides peer sympathy Generally compliant
60 months (Five years)	Single leg stance for 10 seconds, Sit-ups Skips Walks backward Leaps backward Hops on one foot 10 seconds Hops on one foot	Square copies, triangle Placed paper clip on paper Scissor cut outs with scissors	Uses 2,000 words Repeats six-eight word sentences Knows telephone number	Spreads with knife, Independent dressing and bathing	Plays away from parent, Has group of friends Apologizes for mistakes

Developmental reflexes

Table 3: Primitive reflexes

Reflex	Normal until
Sucking	3 months
Rooting	3 months
Grasp	3 months
Foot grasp	9 months
Hand opening	1 month
Placing	Remains
Startle	Startle

In table 5 it showing the primitive reflex of baby according to respective age

Table 4: Spinal reflexes

Reflex	Normal until
Flexor withdrawal	2 months
Extensor thrust	2 months
Crossed extension	2 months

In table 6 it showing the Spinal reflex of baby according to respective age

Table 5: Brainstem reflexes

Reflex	Normal until
ATNR	6 months usually pathological
STNR	6 months
Tonic labyrinthine supine	Pathological
Tonic labyrinthine prone	3 m
Positive supporting	3 m
Negative supporting	3-5 m

In table 7 it showing the Brain stem reflex of baby according to respective age.

Table 6: Mid brain reactions

Reactions	Emerges
Optical labyrinthine	6 months

In table 8 it showing the Mid Brain reactions of baby according to respective age.

Table 7: Cortical reactions

Reactions	Emerges at
Neck righting	5 months
Associated reactions	Pathological
Rising	2-6 months
Body righting	4-6 months
Amphibian	4-6 months
Rotation	6-10 months

In table 9 it showing the Cortical reactions of baby according to respective age.

Table 8: Tilt reactions

Reactions	Emerges at
Supine and prone	6 months
Four point kneeling	7-12 months
Sitting	9-12 months
Kneel standing	18 months
Standing	12-18 months
Staggering reaction	12-18 months
Saving from falling	5-10 months 6-9 months

In table 10 it showing the tilt reactions of baby according to respective age.

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