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# PEDIATRICS CEREBRAL PALSY AND EPILEPSY - CLINICAL OVERVIEW

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## ABSTRACT

Cerebral palsy children are 40 times more likely to develop epilepsy than the birth population. Epilepsy worsens the clinical course of cerebral palsy, complicates rehabilitation, impairs the prognosis of motor and cognitive abilities, and can be potentially lethal. Another concern is the possibility that epileptic seizures will be caused or manifest in the improper use of specific neurorehabilitation techniques (electrophoresis, acupuncture, nootropic drugs, brain stimulators, etc.). Children with cerebral palsy are susceptible to a wide range of epilepsies, ranging from benign idiopathic epilepsies to severe epileptic encephalopathies. The frequent occurrence of epileptic paroxysms and non-epileptic paroxysms complicates diagnosis and interpretation.

**Keywords:** Cerebral Palsy, Epilepsy, Pediatrics, Cannabis.

## I. INTRODUCTION

**1. Cerebral Palsy -:**

Cerebral palsy (CP) is one of the most common types of childhood motor disability. The estimated CP prevalence between one-and-half and more than four per one thousand of live births or children within a specified age range. The different types of CP are Spastic cerebral palsy (CP) — results in stiffness and difficulty moving. Ataxic CP — impairs balance and depth perception. Certain children have multiple types of CP, and the type can change over time. There are medical treatment is available to aid in the improvement of motor skills and communication with the outside world. CP is a frequently occurring intellectual disability with moderate-to-severe significant malformations in the Brain of the most severe form [1]. Certain children have multiple cerebral palsy types affected.

**2. Cerebral Palsy - Causes:**

CP is caused by abnormal development of a portion of the brain in most children. The CP cause is frequently unknown. Abnormalities in genetics, Brain congenital malformations, fevers or maternal infections, injury in fetal are all possible causes. Stroke is the most common occurrence of CP in infants. Fetal stroke is also caused by placenta blood clots obstruct brain blood flow. Cerebral palsy is most frequently caused by prematurity.

Additionally, the condition can be triggered by a head injury sustained in child abuse, accident in a vehicle, or other. CP is a syndrome characterized by weakness, pain, and fatigue caused by muscle imbalances, deformities in bones, syndromes overuse arthritis, and nerve entrapment. Individuals with cerebral palsy may expend up to 3 to 5 times the energy required to walk and move around. Cytomegalovirus, herpes, toxoplasmosis, and rubella can cause infection in the womb and placenta during pregnancy. Rh incompatibility occurs when a mother's Rh blood type is different than that of her child [2].

Maternal Individuals like methyl mercury are increasing affect the risk of a child with CP. Around 30% – 50% of CP patients will have intellectual impairment, spastic quadriplegia, and delayed growth development. The major type of seizure disorder is epilepsy, and half of all kids with CP have single or more seizures that result in intellectual disability. CP is associated with spinal deformities such as curvature (scoliosis), humpback (kyphosis), and finally is saddleback. Drooling is a symptom of CP and is caused by the difficulties over muscles of the tongue, mouth, and throat.

Incontinence is a potential complication of CP that is caused by the difficulty of the muscles to keep the bladder in close control. Seizures are typically triggered when the brain's electrical activity malfunctions, resulting in brain damage. Cerebral palsy risk factors have been identified.

Four groups have been identified statistically as having the bigger risk of prematurity or heart problems. This may initiate a chain of events. Prematurity is associated with high-risk Australia's male-dominated population [3].

Higher risk of small babies born at low birth weight having brain damage, particularly those born to twin mothers.

**3. Epilepsy with CP**

Children are more than likely to experience more than one seizure throughout their lives. Seizures can occur for a variety of reasons, including fever, toxin exposure, metabolic and electrolyte abnormalities. Generalized seizures are more serious compare to partial seizures, come in a different form. Tonic-clonic seizures are the common and severe type of generalized seizure. There is almost always a period of exhaustion following the seizure, and recovery time can range from a few minutes to a few hours.

Absence seizures typically begin in early childhood or early adolescence. Seizures are of two types: generalized and focal. Generalized seizures affect both hemispheres of the brain; focal seizures affect only one. Tonic-clonic seizures also referred to as grand mal seizures, can cause an individual to cry out or collapse to the ground. For up to a few minutes, complex focal seizures can render people confused or dazed [4].

Atonic seizures occur when muscle tone is lost, typically less than a minute. CP and Seizures are frequently caused by brain damage. Seizures following a brain injury may begin in early childhood but are difficult to detect. It is critical to collaborate with your child's physician to monitor for seizures. CP and epilepsy have a higher risk for Neonatal seizures, a low Apgar score, and extremely preterm infants.

EEG epileptiform discharges can be indicated infantile epilepsy. It is prudent to identify infants at risk of developing epilepsy. Epilepsy Children were diagnosed with CP (up to 74.2 percent) during their early stage of life. Seizures result in motor deficits and progressive deterioration of motor difficulties and communication skills. Epilepsy exacerbated cognitive with motor impairment in cerebral palsy patients.

Under the influence of audiogenic seizures, there is frequently a reflex provocation. The difficulty in distinguishing between reflex startle and epilepsy startle is a problem. Increased risk of epilepsy recurrence following discontinuation of an antiepileptic drug (AED).

**4. Treatment for CP/ Procedure:**

Cerebral palsy does not progressively deteriorate. Oral medications are mostly used for a mild decrease in muscle tone. Certain medications may cause undesirable effects like drowsiness, change in BP, and the possibility of liver damage. Botox injections are now a proven treatment for hyperactive muscles with spastic movement disorder for CP. For those who require more intensive treatment, and therapies (physical, occupational, and speech) are available. A BT-A injection has a relaxing effect that lasts approximately three months and is most effective when combined with the splint and physical therapy, CP causes pain for stress and strain in various body parts. Diazepam is proven to alleviate the pain in the muscle spasms, as has gabapentin. In spasticity, stiffness makes difficulty in moving and walking around difficult or painful, orthopaedic surgery is frequently recommended. While tendon surgery may alleviate symptoms for CP, it may also have long-term negative consequences. Additionally, surgery can be used to correct or significantly improve the spinal deformities of CP individuals. Physical therapy is used to prevent or treat contractures of the joints. A selective dorsal rhizotomy is a procedure that involves the amputation of some sensory nerve fibers that originate in the muscles and enter the spinal cord. Treadmill training aims to improve balance and symmetry in the lower extremities. It has been demonstrated that robotic gait training reduces the time and labour burden associated with traditional treadmill training. Occupational therapy aims to improve the child's fine motor function in the upper extremities. Orthotics, adaptive equipment, and assistive technology are used to enhance a child's functional abilities and assist with daily living activities. Therapy like Constraint-induced is an exciting new treatment option for CP. Recreation therapy promotes participation in arts and cultural activities, as well as sports. Therapy like speech and language can help children communicate more clearly. Treatments for eating and drooling problems are frequently necessary for CP children with difficulties in drinking and eating due to the uncontrolled movement of their mouth, tongue, and jaw. The FDA has not approved the CP treatment on alternative therapies. Assistive devices can significantly aid some children with CP in improving their communication skills. Orthotic devices assist in resolving muscle imbalances and promoting independent mobility. Glasses, magnifiers, large font book prints, computer typefaces are all examples of visual aids. Acupuncture, neurodevelopmental training sensory integration, electrical stimulation, and therapy like suit hippo, music, video game, and stem cell are all additional interventions. Most of the children with CP grow up to

the adult stage with early intervention, appropriate medical treatment, and on going service support. The majority of children are diagnosed with cerebral palsy during their first two years of life. Doctor order battery of tests to assess a child's motor abilities. If a child continues to lose motor skills, the issue is more than likely not CP. Certain metabolic disorders can present as CP. In the development, specialist referrals can aid in more precise diagnosis and treatment plan [5,6].

**5.0 Treatment for Seizures:**

Anticonvulsant medications are the most frequently used type of treatment for seizures and CP. The ketogenic diet is prescribed to children who do not respond to antiepileptic medications. If medications and diet do not work, surgery may be the last resort in some cases. The type of surgery will be determined by the type of seizures experienced by the child and the severity of the seizures. Surgery is a major treatment method for children with severe seizures [7].

Children with uncontrollable seizure disorders may undergo the following surgeries: Focal Resection, Hemispherectomy, and Corpus Callosotomy. In general, medications are prescribed for the seizure experienced by an individual. Biofeedback, Special exercise, prescription-based medications, surgery, or surgically device implanted to assist muscles are all the incontinence treatment. Numerous kids with the issue of CP and intellectual disability also suffer from epilepsy. Numerous additional conditions cause by CP.

**5.1 Treatment for Seizures – Cannabidiol (CBD) / Medical Marijuana and Epilepsy:**

The most frequently used type of treatment with CP is an anticonvulsant medication. Only when medications fail to control the seizure frequency, the diet used to help control the seizure. The ketogenic diet, which is high in fat and low in carbohydrates is given to children who do not respond to anti-seizure medications. If medications and diet do not work, surgery may be the last resort in some cases. Surgical procedures for children with uncontrollable seizure disorders include the following: A part of the brain portion is removed and electrodes are implanted during focal resection [8].

Hemispherectomy: Almost an entire brain side was removed to disable the area of the brain responsible for the seizures. CBD's most frequently reported side effects are decreased appetite, decreased fatigue, and decreased fatigue. The FDA approved the CBD for the treatment diagnosis of Lennox- Gastaut and Dravet Syndrome in kids of age and older years. The term marijuana is frequently used to refer to the cannabis leaves and flower female. Additionally, approved the seizure treatment for marijuana.

For several years, the most common use of CBD for epilepsy and other neurological behaviors has been in research. The precise number of seizures has been debated for far too long. Hemp is a Cannabis Sativa L cultivar that was historically cultivated for its fibrous seed and stalks.

Moreover, Hemp has historically contained lower THC concentrations and higher CBD concentrations. Until recently, cannabinoids are taken from the hemp plant and that included CBD, were classified as marijuana. Epidiolex is a 98 percent pure CBD oil extract from the harvested cannabis. It is manufactured by Greenwich Biosciences, a subsidiary of GW Pharmaceuticals based in the United States. Epidiolex was administered to 689 people with different types of conditions. Sleepiness, diarrhea, decreased appetite, and changes in liver function were the most frequently reported side effects. The rate of discontinuation is because of side - effects that low and occurred most frequently in the patient taking the higher level of dose [9].

**6. Classification of CP children and Assessing Impairments:**

Numerous classification systems for CP have developed. Numerous techniques are classified according to their etiology, the body parts involved, the movement type of disorder present, or the degree of motor involvement. The GMFCS was developed using the World Health Organization's concept of classification according to abilities and limitations.

**Table 1.** GMFCS for CP children

| GMFCS | Description |
|---|---|
| Level I | Walks unrestrictedly; advanced in the motor-gross skills are limited. |
| Level II | Outdoor walking, and community without the use of assistive aids. |
| Level III | Walking outside and in the community with assistive mobility aids; limits include walking |

| | |
|---|---|
| | in the community and outdoors. |
| Level IV | Children are carried or use powered mobility outside or in the community because they have limited self-mobility. |
| Level V | Even using the assistive technologies, self-mobility is severely constrained. |

GMFCS = Gross Motor Function Classification System for Cerebral Palsy.

## II. CONCLUSION

**Possibility of preventing cerebral palsy:**

Several factors associated with congenital CP are manageable or preventable. Rubella, or German measles, is to care for preventable if pregnant women are vaccinated for this type of disease. Early in pregnancy, Rh incompatibilities can also be managed. These causes of CP vary widely [10]. Electronic fetal monitoring has not proven effective in preventing CP. According to experts, electronics monitoring fetal has no long-term benefits. It was frequently employed to bolster obstetric litigation. Magnesium sulfate appears to reduce the risk of CP in women who are pregnant prematurely. It is unknown whether it benefits of born in full term. Mothers taken magnesium sulfate may experience nausea and respiratory depression. Caffeine has been used to treat prematurity-related apnea and decrease the risk of premature infants developing cerebral palsy. Caffeine has been linked to long-term negative effects in preterm infants. Corticosteroids taken during pregnancy have no significant association with the development of CP pre-term infants [11]. Shortly of cooling high-risk full-term infants after birth may help prevent the issue of disability, and this can be beneficial for only certain types of CP caused by brain damage.

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