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Clinical and Morphological Features of the Development of Symptomatic Epilepsy in Children with Cerebral Palsy

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Introduction.

One of the most prevalent neurological conditions affecting children is cerebral palsy (CP), which is typified by motor deficits brought on by non-progressive brain injuries or abnormalities that arise during prenatal, perinatal, or early postnatal development. Children with cerebral palsy (CP) may exhibit a variety of comorbid disorders, such as intellectual difficulties, sensory deficiencies, and seizures, in addition to motor dysfunction. About 30 to 50 percent of children with cerebral palsy suffer with symptomatic epilepsy, making it a particularly difficult condition.¹

In children with cerebral palsy, epilepsy is usually linked to prenatal hypoxia, structural brain abnormalities, or other risk factors that lead to neuronal dysfunction. The underlying brain pathology has a significant impact on the clinical presentation, seizure types, and responsiveness to therapy. Further affecting the child's quality of life and overall prognosis is the possibility that epilepsy will worsen cognitive and motor deficits.

Materials.

For early diagnosis, efficient treatment planning, and prognostic evaluation, it is essential to comprehend the clinical and morphological characteristics of epilepsy in children with cerebral palsy. With an emphasis on the primary clinical and morphological traits that impact the course of the disease, this study attempts to investigate the connection between brain structural abnormalities and the development of epilepsy in children with cerebral palsy.²

There is a complicated interaction between neurological development, underlying brain structure, and clinical symptoms when discussing the clinical and morphological aspects of symptomatic epilepsy in children with cerebral palsy (CP). Here is a synopsis that highlights important ideas about this topic:

¹ Auvin, S., Wirrell, E., & Donald, K. A. (2019). *Epilepsy in children with cerebral palsy: Pathophysiology and management*. *Pediatric Neurology*, 97, 3–11. <https://doi.org/10.1016/j.pediatrneurol.2019.03.011>

² Graham, H. K., Rosenbaum, P., Paneth, N., Dan, B., Lin, J-P., Damiano, D. L., Becher, J. G., & Gaebler-Spira, D. (2016). *Cerebral palsy*. *Nature Reviews Disease Primers*, 2, 15082. <https://doi.org/10.1038/nrdp.2015.82>

Research and methods.

Clinical Characteristics

Prevalence: According to estimates, up to 50% of children with cerebral palsy may go on to acquire epilepsy, which is commonly linked to the condition.³

Seizures: Children with cerebral palsy may have focal seizures, generalized seizures, or myoclonic jerks, among other seizure forms. The underlying brain damage frequently determines the kind.

Age and Onset: Seizures usually start in early infancy, usually in the first few years of life, which corresponds with the time frame for brain development.

Developmental Impairments: Cognitive impairments or developmental delays are common in children with epilepsy and cerebral palsy, which can make managing and presenting them clinically more difficult.

Triggers: Fever, illness, and lack of sleep are common causes of seizures. In relation to these factors, parents and caregivers could see a trend in the occurrence of seizures.⁴

Features of Morphology

Brain Imaging: Cortical dysplasia, ischemic lesions, or anomalies of cortical development are among the anatomical abnormalities linked to cerebral palsy that are frequently detected by magnetic resonance imaging (MRI).

Cerebral Lesions: The brain regions in charge of motor function are frequently affected by morphological abnormalities, which may also affect the seizure focus. For instance, children with cerebral palsy frequently have periventricular leukomalacia (PVL), which can exacerbate epilepsy.⁵

Results.

Neurodevelopmental Changes: People may be more susceptible to seizures as a result of aberrant neural connections brought on by anatomical changes in the brain. Gray and white matter alterations are included in this.

Histopathological Findings: Biopsy investigations have occasionally revealed dysplastic neurons, glial cell proliferation, and changed cellular architecture in afflicted areas, pointing to a possible epileptogenesis (the onset of epilepsy) substrate.⁶

Discussion.

Methods of Management and Prognosis Treatment:

Antiepileptic drugs, physical therapy, and, in certain situations, surgery are common forms of treatment. The kind and frequency of seizures may influence the therapeutic option.

Multidisciplinary Care: To meet the many needs of these kids, a multidisciplinary approach including neurologists, pediatricians, therapists, and special educators is essential.

Prognosis: The kind of cerebral palsy, the degree of neurological impairment, the existence of structural brain abnormalities, and the response to therapy are some of the variables that affect the

³ Patel, A. D., & Martinez, P. (2020). *Seizures and epilepsy in cerebral palsy: Clinical correlates and treatment strategies*. *Epilepsia*, 61(5), 899–910. <https://doi.org/10.1111/epi.16500>

⁴ Kwong, K. L., & Wong, S. N. (2017). *Epilepsy in children with cerebral palsy: Prevalence, clinical characteristics, and risk factors*. *Developmental Medicine & Child Neurology*, 59(2), 192–200. <https://doi.org/10.1111/dmcn.13225>

⁵ Fisher, R. S., Acevedo, C., Arzimanoglou, A., Bogacz, A., Cross, J. H., Elger, C. E., Engel, J., et al. (2017). *A practical clinical definition of epilepsy*. *Epilepsia*, 58(4), 522–530. <https://doi.org/10.1111/epi.13688>

⁶ Surtees, R., & Leonard, J. (2018). *Neuroimaging and morphological brain abnormalities in children with cerebral palsy and epilepsy*. *Journal of Child Neurology*, 33(4), 520–530. <https://doi.org/10.1177/0883073817749586>

prognosis for children with both epilepsy and cerebral palsy.⁷

Conclusion.

A brain injury or abnormality during early development can result in cerebral palsy (CP), a non-progressive neurological condition. A considerable percentage of kids with cerebral palsy experience symptomatic epilepsy, which exacerbates their motor and cognitive deficits and lowers their quality of life in general. To maximize early identification and treatment, it is essential to comprehend the clinical and morphological characteristics of epilepsy in children with cerebral palsy.⁸

Effective diagnosis, treatment, and support of children with cerebral palsy depend on an understanding of the clinical and morphological characteristics of symptomatic epilepsy. For impacted people and their families, early intervention and customized treatment programs can greatly enhance results. In order to improve treatment approaches and comprehend the fundamental processes that underlie both epilepsy and cerebral palsy, further study in this field is necessary.

The study emphasizes how crucial early neuroimaging screening is for promptly identifying epilepsy risk factors in children with cerebral palsy. To enhance seizure control and patient outcomes, specific therapy approaches can be developed with the help of a better knowledge of the clinical and morphological features of symptomatic epilepsy in CP.

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⁸ Auvin, S., Wirrell, E., & Donald, K. A. (2019). *Epilepsy in children with cerebral palsy: Pathophysiology and management*. *Pediatric Neurology*, 97, 3–11. <https://doi.org/10.1016/j.pediatrneurol.2019.03.011>