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Specialized and updated training on supporting advance technologies for early childhood education and care professionals and graduates

MODULE III.2

Pathologies at an early age

Epilepsy

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Specialized and updated training on supporting advance technologies for early childhood education and care professionals and graduates

Content

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I. Introduction

Epilepsy is one of the most common neurological disorders that occur during childhood. It can occur as a result of a wide range of CNS disorders such as brain infection, toxic, metabolic disorders, genetic malformations or acquired brain damage. It involves the presence of epileptic seizures (both focal and generalized).

Although most cases of epilepsy at school age are benign and have a good prognosis, the estimagtizante load that epilepsy usually has has a negative influence on the child, causing a negative social and psychological impact on their schooling process. In this chapter, the main epileptic syndromes will be reviewed, as well as the presence of certain syndromes in three age periods.

II. Objectives

To Know the fundamental characteristics of childhood epilepsy.

To Know the epileptic syndromes most frequent at this stage of development.

III. Specific contents of the topic

1. Epilepsy and neonatal period (birth to 2 months)
2. Childhood-onset epilepsy (2 months to 12 months)
3. Childhood-onset epilepsy (from one to 12 years)

3.1. What is epilepsy?

Epilepsy is a neurological disorder of a chronic nature; whose clinical manifestation is **epileptic seizures.** According to the International League Against Epilepsy (ILAE), epilepsy is classified by differentiating epileptic seizures on the one hand and, on the other hand, categorizing the types of epilepsy and epileptic syndromes (ILAE, 2017).
Epilepsy can affect people of all ages, although there is a higher incidence (greater number of cases) between the first years of life and in old age. This disorder could be defined by the presence of at least **two epileptic seizures** not provoked (without stimulus that causes it) or reflex (induced by a stimulus: light, auditory, tactile, etc.) that occur separately on different days. (ILAE, 2014., Caraballo, 2019).

Epileptic seizures are the abnormal transient discharge of synchronous neurons in the cerebral cortex that produces a clear effect observable by the person experiencing it or by an observer (Fisher et al., 2017).

Epileptic seizures (Figure 1) are classified according to the **onset of the abnormal discharge** that gave rise to them, therefore, there are two types:

1. **Focal: epileptic** seizures that originate in a localized area of the cerebral cortex (known as the epileptic focus).
    a. They are seizures with motor, sensory, or psychomotor manifestations that depend on the location of this focus.
    b. They do not initially produce loss of consciousness.
2. **Generalized:** They affect simultaneously and from the beginning the entire cerebral cortex.
    a. They cause loss of consciousness since the beginning of the seizures.
    b. The most common generalized seizures are tonic-clonic seizures.

Within generalized seizures, there are two types of crises that occur within childhood and adolescence. *In the grand mal crisis,* the child suddenly loses consciousness and may fall to the ground. This loss of consciousness is followed a few seconds later by the generalized contraction of all the muscles (tonic phase) that are followed by whole-body jerking (clonic phase). There is relaxation of sphincters and frequent biting of the tongue. The fall that causes the seizure can cause trauma or other injuries. After the seizure, the child falls asleep, disoriented, or drowsy. On the other hand, the *small mal type of seizures* is manifested by the presence of generalized seizures, although there are no seizures and there is a brief loss of consciousness (Caraballo, 2019).

Finally, ***epileptic syndromes*** refer to the association of a type or several types of seizures showing electroencephalographic (EEG) interictal (during the seizure) or ictal (the epileptic seizure itself) alterations that compromise the proper functioning of the central nervous system (CNS).

The most common forms of these syndromes are age-dependent or self-limiting, particularly in school-age children, which means that these epileptic seizures will remit or disappear definitively with brain maturation and that they also respond very well to treatment with antiepileptic drugs.

3.2. Classification of epilepsies and epileptic syndromes according to age

The classification proposed by the ILAE, (Figura 1) is created to respond to the categorization of **epilepsy** in a clinical context, being necessary for the diagnosis, the classification in three levels. Therefore, as we will see throughout this chapter, it is necessary to differentiate between the type of **epileptic seizure, the epileptic syndrome and the type of epilepsy** (ILAE, 2017).

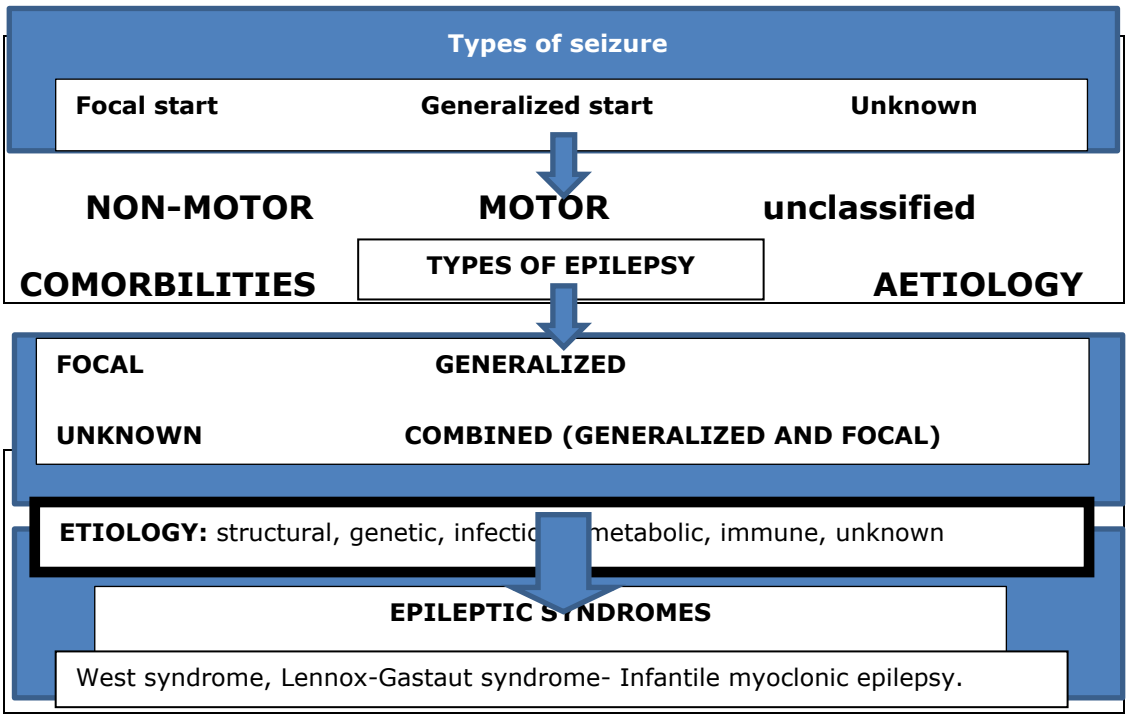

Figure 1. Classification of seizure types, based on ILAE, 2017.

The first diagnostic approach, once the seizure is identified (Figure 1) is to classify the type of epilepsy that will be part of an epileptic syndrome. Considering the classification made by the ILAE (2017) the epileptic syndrome (*set of symptoms and signs that define an epileptic disorder)* is classified into **four types of epilepsy** that are:

1. Focal epilepsy (motor onset the start of the engine).
2. Generalized epilepsy.
3. Focal or generalized epilepsy (combined).
4. Unknown, it is not known whether its origin is focal or generalized.
    a. Symptomatic or probably symptomatic.

With respect to *focal epilepsy,* (Figure 2) it is associated with abnormal neuronal discharge in a specific area of the brain and may include alterations in behavior, similar to the functions of the region where they originate. Focal seizures *can be with motor onset or with non-motor onset.* Symptoms with motor onset involve musculature,

muscle contractions, automatisms, spasms, movements. In contrast, seizures *with non-motor onset* will involve the presence of behavioral, cognitive, emotional, sensory detection (Salinas et al, 2018).

With respect to *generalized seizures*, they result in loss of consciousness, but without more specific sensory or behavioral characteristics (Salinas et al, 2018).

Seizures of unknown cause are those seizures that cannot be classified due to lack of information or cannot fall into a certain diagnostic category. Also called symptomatic or probably symptomatic.

Type of epilepsy	Characteristics	Signs/symptoms
Focal motor epilepsy	Seizures that occur in a specific area of one of the two cerebral hemispheres.	It involves the musculature in some way, the event could be the increase or decrease in muscle contraction that generates the movement. No loss of consciousness
Focal epilepsy in the motor	Seizures that occur in a specific area of one of the two cerebral hemispheres.	Presence of behavioral detection, cognitive, emotional, sensory. No loss of consciousness
Generalized epilepsy	Seizures whose semiological features indicate that its onset compromises both cortical hemispheres. Generalized seizures as focal	Tonic-clonic seizures. Loss of consciousness
Focal or generalized epilepsy (combined)		Both generalized and focal seizures.
Unknown epilepsy	Seizures that cannot be classified due to lack of information or do not fall into a certain diagnostic category.	The onset of seizures is unknown, and the person has an unknown type of epilepsy

Figure 2. Types of epilepsy. Based on Palacios et al, 2016; ILAE, 2019

3.3. Evolutionary development of epilepsy

Brain maturation is a process that involves innumerable transformations, produced from conception, throughout gestation and later, until reaching maturity, reaching an adult brain. If the child's brain is expressed at each age in relation to the degree of maturation reached, with given patterns of behavior, before any

functional or structural disorder that appears, his behavior will also be expressed differently (Etchepareborda, 1999).

Numerous studies show that the brain of the newborn has multiple fundamental differences in function, cellular composition and connectivity compared to the brain in childhood or in adulthood (Fons-Estupiña, 2018) Together with this, the presence of congenital brain abnormalities, inborn errors of metabolism and genetic disorders can determine the presence of recurrent seizures during the neonatal period (Caraballo, 2019).

Within the classification by age of epilepsy and following the classification of Browne (2009) in the neonate-infantile period, we highlight:

1. Epilepsy and neonatal period (birth to 2 months)
2. Childhood-onset epilepsies (2 months to 12 months)
3. Childhood-onset epilepsies (from one to 12 years)

3.3.1 Epilepsy and neonatal period

The neonatal period is especially vulnerable to seizure development because of the combination of specific factors in a developing CNS. Neonates have a highly excitable brain so the clinical expressiveness of a crisis in this age group is **focal type** by neuronal discharges of erratic origin in **one or another hemisphere**. (Etchepareborda, 1999., Browne et al, 2009., Fons-Estupiña, 2018).

The brain at this stage of neurodevelopment is manifested by presenting a bioelectrical continuity, interhemispheric synergy, wake-sleep differentiation, and reactivity to external stimuli in sleep.

The increased susceptibility of the newborn brain has the following characteristics:

1. **Anatomical maturity:** The presence of epileptic seizures is due to poor stratification of the cerebral cortex, poor development of dendrites, immaturity of the commissural pathways and cortico-subcortical pathways.
2. **Increased excitation:** Abundant glutaminergic synapses appear, with abundant receptors of the neurotransmitter glutamate in the hippocampus and with a certain proportion of receptors that we know are involved in the phenomena of brain plasticity.

Neonates often exhibit repetitive and stereotyped behaviors that may be mistaken for an epileptic seizure. These behaviors can range

from repeated sucking or performing other orobucolingual movements, adopting abnormal postures, pedaling, or rowing movements with the arms, blinking, nystagmus or apnea. However, it is important to note that, if these behaviors are observed from a record of EEG activity, they are not generally associated with an activity that could indicate an epileptiform phenomenon (Browne, 2009).

The presence of **epileptic seizures** at this stage of neurodevelopment constitutes an alteration of neurological function that can *be motor, behavioral, autonomic (alteration of the autonomic nervous system) or a combination of the three (* Fons-Estupiña, 2018). Neonatal seizures are classified into *clonic, tonic, and myoclonic.*

Clone seizures consist of rhythmic jerks of muscle groups and may follow both a focal and multifocal pattern. In *multifocal clonal seizures*, movements may oscillate from one part of the body to the other. Although focal seizures associated with localized brain lesions can be seen (see neonatal strokes). Theycan also be seen in disorders that affect the brain diffusely, such as asphyxia, subarachnoid hemorrhage, hypoglycemia, and infections. (Brown, 2009).

On the other hand, ***tonic seizures*****,** the neonate adopts asymmetrical postures of the trunk or there is a deviation of the eyes to one side.

With regard to ***myoclonic seizures*****,** they are seizures very similar to those affecting older children and consist of rapid jerking of the muscles. These crises manifest themselves in the form of bilateral jerks, although occasionally a unilateral or focal myoclonus may appear.

The most frequent causes of neonatal seizures are *hypoxic-ischemic encephalopathy, ischemic and hemorrhagic strokes,* followed by *CNS infections congenital malformations of metabolism and epileptic syndromes of genetic origin*. During the first months and subsequent years of life, the infant is at high risk of seizures, due in part to the great cortical excitability and the poor maturation of inhibitory mechanisms. And because of birth, the infant is at risk from a series of aggressions, such as trauma, hypoxic-ischemic problems, intracranial hemorrhages and infections.

The presence of epileptic seizures mayindicate the existence of a CNS disorder and its recognition may be relevant for its subsequent approach. Seizures often remain a significant prognostic factor for an unfavorable neurological outcome.

Neonatal epileptic syndromes, as well as their electroclinical characteristics, are:

1. Benign neonatal seizures (fifth day seizures)

2. Benign neonatal epilepsy (ENBF)

3. Early childhood epileptic encephalopathy or Ohtahara syndrome.

4. Early myoclonic epileptic encephalopathy (PMS).

With respect to benign neonatal seizures, *also called fifth-day seizures*, unilateral, bilateral clonal movements of the limbs and face lasting minutes are observed, and apnea may appear. Seizures disappear spontaneously in most cases and the evolution is favorable. (Fons-Estupiña, 2018).

Familial benign neonatal epilepsy encompasses a group of benign epileptic syndromes that begin on the second or third day of life (in full-term newborns) that are defined by the presence of **tonic seizures** (*increase in muscle contraction for seconds or minutes)* with autonomic symptoms (symptoms, palpitations, etc.).

A family history of neonatal seizures may be found. Seizures begin with an initial tonic phase (symmetrical or asymmetrical) associated withapnea/cyanosis, followed by clonic movements, unilateral or bilateral, symmetrical, or not.

Semiology (study of symptoms) can also constitute a "*fixed gaze*" with arrest of the activity associated with autonomic or oculofacial phenomena. Seizures are brief and common (up to 30 episodes a day). Remission of seizures occurs around 4 to 6 months of age. Neurodevelopmentis usually normal and some of these children may have febrile or afebrile crises in childhood after a period without seizures (Fons-Estupiña, 2018).

Early childhood epileptic encephalopathy (Ohtahara syndrome) is a rare epileptic syndrome that has a poor prognosis. The onset of seizures may occur in the fetal period or after birth. The type of seizures, as in benign neonatal epilepsy, are tonic, symmetrical, or asymmetrical seizures, although focal motor seizures may also occur in approximately 30% of these infants.

Among the most frequent causes, cortical developmental malformations, genetic alterations related to channelopathies and synaptopathies stand out. Progression to infantile spasms or multifocal epilepsy is very common. (Fons-Estupiña, 2018).

With regard to *early myoclonic encephalopathy*, syndrome similar to Ohtahara, but differentiating the type of crises that are predominantly *myoclonus* The frequency of seizures can be variable but is usually continuous. The onset of crises is usually early, in the first hours or days of life and in some cases intrautero. Seizures are focal or subtle clones and may be followed by myoclonus. (Fons-Estupiña, 2018).

3.3.2 Epilepsy in infancy and early childhood (2 months to 12 months)

The groups of epileptic syndromes and the specific ones that begin between 2 to 12 months, are the *symptomatic and probably symptomatic focal epilepsies*, of which are the mesial, lateral, frontal, parietal, and occipital temporal epileptic syndromes). (Browne et al, 2009).

Regarding *generalized/symptomatic epilepsies*, highlight West *syndrome* and tonic seizures and atonic seizures.

With respect to *idiopathic and symptomatic generalized epilepsies*, there are three types of epilepsy: benign childhood epilepsy with centrotemporal tips, benign childhood epilepsy of early onset (with vegetative symptoms), and late-onset occipital epilepsy of childhood (with visual symptoms).

When we refer to symptomatic or probably symptomatic crises, these are related to the presence of structural injury.

And finally, with regard to seizures that do not necessarily carry a diagnosis of epilepsy, they are febrile seizures.

Within focal epilepsies and probably symptomatic, they can appear at any age. They produce three types of seizure.

1. Simple focal seizures
2. Complex focal seizures (psychomotor, temporal lobe)
3. Tonic-clonic seizures (grand mal)

Within this classification is organized into five syndromes where the semiology of the crisis will respond to the location of the epileptogenic zone (temporal, frontal, occipital, parietal lobe).

For example, if the epileptic focus is located in the temporal lobe, hallucinations of taste, vertigo, and auditory illusions, etc. may appear; in the occipital lobe, the symptoms are visual; in the frontal lobe, presence of stereotyped movements, complex automatisms, etc. On the other hand, if the location is parietal, the symptoms are

burning in the contralateral hemibody, involuntary movements of the same in the form of flexion-extension.

A special mention within this category of focal epileptic syndromes in which is the *hemiconvulsion-hemiplegia, syndrome* that constitutes a rare form of epilepsy that occurs during the first two years of life. It consists of a sudden and prolonged unilateral clonic crisis followed by unilateral hemiparesis ((loss of sensation on the contralateral side of seizure onset) (Browne, 2009).

As for *generalized/symptomatic* epilepsies, there are four types of epilepsies (*West* syndrome, *tonic seizures, atonic seizures* and *Dravet syndrome)*

With respect to *West syndrome*, this type of epilepsy appears in children during the first year of life, with the peak age of onset between 4 and 6 months. Characterized by the presence of a triad of symptoms consisting of infantile spasms (IE), intellectual disability and a characteristic EEG called hypsarrhythmic.

These electroencephalographic alterations, characteristic of this syndrome causea stop of the neurological maturation process of the child at the beginning of the critical manifestations (during the crisis) and it is common to find its focal onset, age-dependent, being exceptional its aparición after the year of age.

As for the symptoms of this syndrome, highlight the presence of infantile spasms that are brief, bilateral, and symmetrical contractures of the muscles of the neck, trunk and extremidades and that in a sudden way determine the appearance of the spasm either in flexion, extension or mixed, being able to be of differentintensity (mild or massive).

On the other hand, *tonic seizures* consist of the sudden appearance of an increase in tone in the extensor muscles. The duration of seizures is longer than that of myoclonic seizures. On the other hand, in *atonic seizures* there is a sudden loss of muscle tone, involving the head, trunk, jaw or muscles of the extremities, which causes falls that cause trauma and injuries due to this type of crisis.

Another of the syndromes that appear at this stage of development is *Dravet Syndrome*. Se presents in the first year of life in a normal child with prolonged, febrile, and afebrile seizures, focal and generalized tonic-clonic. Seizures are usually untreatable, and from the second year of life, children show cognitive and behavioral impairments. (ILAE, 2017). A syndrome characterized by the onset of seizures typically around 6 months of age. Most babies have had

an onset of seizures before 15 months of age; however, a small minority of cases begin in the second year of life.

The first seizure is associated with fever in about 60% of cases. Not all babies start with febrile seizures. The sensitivity of seizures to fever can persist throughout life. Head size and neurological examination are usually normal, but over time, ataxia and pyramidal signs may develop. (ILAE, 2017).

3.3.3. Childhood-onset epilepsies (from one year of age)

Among the epileptic syndromes that occur at this stage, we find *symptomatic and probably symptomatic* focal epilepsies, idiopathic *focal epilepsies, generalized idiopathic epilepsies, epileptic encephalopathies and those chrisis*that do not necessarily entail a diagnosis of epilepsy.

With respect to *symptomatic and probably symptomatic focal* epilepsies, there are the five mesial, lateral, frontal parietal and occipital temporal epileptic syndromes. These types of syndromes involve three types of seizures: simple focal seizures; Complex focal (psychomotor, temporal lobe) and tonic-clonic (grand mal). (ILAE, 2017., Browne, 2009).

On the other hand, *idiopathic focal epilepsies* may be the significant component of three important syndromes: benign *childhood epilepsy with centrotemporal spikes, benign occipital epilepsy of childhood, and Lennox-Gastau and Landau Kleffner epileptic encephalopathy*.

Benign partial epilepsy of *childhood with centrotemporal tips (rolandic) represents* a type of epilepsy that begins between 3 and 10 years in previously healthy children, characterized by the presence of focal sensory-motor seizures affecting the face, oropharynx, and upper limb (oro-facio-brachial clones, speech blockage and oral paresthesias). Seizures are infrequent and predominantly nocturnal. No treatment is recommended, except for frequent crises. The EEG shows a focus of tips in the center-temporal, uni or bilateral region. (Martínez et al, 2014).

Within *childhood epilepsy* with *occipital* paroxysms, also known as *Panayiotopoulos syndrome,* which appears in young children with a peak age of five years. The main symptoms are characterized by ictal vomiting, deviation of the eyes, and often with impaired consciousness. Seizures are rare and often solitary, but according to Browne (2009) about a third of children, episodes evolve into focal status epilepticus. The prognosis of this type of early onset is excellent and usually resolves within a few years of its onset.

As for *epilepsy with absence in childhood*, they can produce typical, myoclonic and tonic-clonic seizures of generalized onset. Childhood absence epilepsy is a genetic/idiopathic generalized epilepsy that should be considered in an otherwise normal child with multiple daily absence seizures associated with generalized peaks and waves of 2.5 to 3.5 Hz. Absence seizures are caused by hyperventilation. This syndrome is characterized by the appearance of frequent absence crises between 2 and 12 years (maximum 5-6 years). Development and cognition are typically normal. Attention deficit hyperactivity disorder and learning difficulty may occur. Seizures are usually self-limiting. (ILAE, 2017).

With regard to *Lennox-Gastaut syndrome,* severe form of epileptic encephalopathy that begins in childhood. Children with Lennox-Gastaut syndrome have frequent seizures of various types. Seizures usually begin between the ages of 2 and 6 and are usually accompanied by intellectual disability. Tonic seizures are a major component and exhibit a slow-wave tip EEG pattern. However, children with this syndrome usually present a mixture of different types of seizures, such as tonic-clonic, myoclonus, typical absences and head falling, which is a form of atonic, tonic, or myoclonic seizure. This syndrome is characterized by having very frequent seizures and it is common for atypical absence crises to go unnoticed by the parents and for the child (Browne, 2009).

And finally, *Landau-Kleffner syndrome* is defined by a subacute onset of acquired aphasia in a child with normal previous development and cognition. The syndrome begins between 2 and 8 years of age (maximum between 5 and 7 years), or rarely later. Seizures may not occur in all cases and, when present, are infrequent and self-limiting. However, there is a high risk of significant residual language impairment.

This syndrome is characterized by a subacute onset of progressive aphasia in a child with previous age-appropriate language development. The initial presentation may be with progressive aphasia (40%), seizures, or both. Children become progressively unable to understand the spoken word, stop understanding when spoken to them and respond verbally.

Psychiatric and cognitive disorders are commonly observed in addition to language impairment. Language impairment typically fluctuates. Seizures and EEG abnormalities resolve with age in most cases, however, in most (>80%) residual language impairment is observed that can be severe (especially if onset is earlier). (ILAE, 2017).

Table 3. Main epilepsy and epileptic syndromes during childhood

NEONATAL	
Severe epileptic syndromes	**Benign epileptic syndromes**
Ohtahara syndrome Myoclonic epileptic encephalopathy	Benign neonatal seizures Benign neonatal epilepsy
BREASTFEEDING/EARLY CHILDHOOD	
Severe epileptic syndromes	**Potentially benign epileptic syndromes**
West syndrome Lennox-Gastaut syndrome Dravet syndrome Landau-Kleffner syndrome	Benign epilepsy of childhood with centrotemporal tips. Benign epilepsy (vegetative symptoms). Benign occipital epilepsy of childhood. *Symptomatic and probably symptomatic focal epilepsies* (mesial, lateral, frontal, parietal, and occipital temporal epileptic syndromes).
CHILDHOOD (FROM THE FIRST YEAR ONWARDS)	
Epileptic syndromes of reserved prognosis	**Benign epileptic syndromes**
Symptomatic and probably symptomatic focal epilepsies Lennox-Gastau Landau-Kleffner syndrome	Benign partial epilepsy of childhood with centrotemporal tips (rolandic) Childhood epilepsy with occipital paroxysms (Panayiotopoulos syndrome) Epilepsy with absence in childhood

3.4. Neuropsychology of epilepsy

In general, epilepsy as such does not produce cognitive impairment, however, if it appears and is noticeable after the neuropsychological evaluation performed, this deterioration may be due to the presence of epileptic encephalopathy or an underlying brain injury (Ronconi, 2019).

Therefore, the process of describing the possible neuropsychological alterations found will have an added complexity that must be adapted to each child in particular. Another interesting issue is to assess that both behavioral and cognitive difficultiesmay be due to the impact of the underlying lesion or the epileptiform activity itself (electrical discharges) in neural networks in the process of maturation, which as we know, the child's brain is a developing brain.

The literature shows a decrease in the neuropsychological performance of the student with epilepsy in multiple domains, including general intelligence (Salinas et al, 2018).

1. *Cognitive functioning*: Although most children with epilepsy show normal intellectual functioning, significant variability is observed within groups , with a higher percentage in children outside the

normative values when assessed with the general child population.

2. *Attentional functioning:* Certain antiepileptic drugs can cause lower attentional span concentration, and fatigue. It should also be noted that some epileptic syndromes have been associated with a specific alteration in attentional control, such as, for example, childhood absence epilepsy and, in addition, it is common to find comorbidity with ADHD (combined type). Importantly, studies show that attention problems can precede the onset of epilepsy, which has led to these two conditions being described as concurrent comorbidities (Salinas et al, 2018).
3. *Executive functions: Research on the effect of epilepsy* on the development of executive functions in children shows poorer executive performance in generalized epilepsy compared to, for example, focal onset epilepsy. The most frequent alterations found in these functions have more to do with working memory, processing speed and difficulty in solving problems. Thus, as these authors affirm, problems in executive functions have been shown to be a predictor of adaptability and quality of life in children with epilepsy as significant as the variables related to the disease and its severity. (Salinas et al, 2018).
4. *Memory:* It is observed that the type of epilepsy and its location (onset versus focal epilepsy) (hemispheric lateralization) affect mnestic performance (retrieval of previously stored information). Also, as a prognostic factor of this performance, assess that focal onset epilepsy originating in the frontal or temporal region may be a risk factor for observing low memory performances.
5. *Learning difficulties: There is* agreement in this regard when considering the presence of low academic performance both the level expected for their age and grade and an academic performance below what is expected at the cognitive level in the child with epilepsy. In terms of specific learning disorders, math problems are the most prevalent and verbal performance in both reading difficulty and the presence of poor performance on semantic memory tests.

Summary

This chapter has reviewed the main epileptic syndromes in the three stages of development with their most defining characteristics and showing the neuropsychological impact that these types of epilepsy could show.

Glossary of terms

Asymmetric seizures: crises that cause a sustained muscle contraction consisting of the extension of one of the arms.

Channelopathies: These are disorders of muscle membrane excitability associated with mutations in calcium, sodium or potassium channels and acetylcholine receptors. This group of diseases has been called channelopathies.

EEG: Electroencephalogram.

Epilepsy: A CNS disease in which one or more seizures occur. The word comes from ancient Greek and means "sudden attack that overwhelms".

Epileptic Syndrome: A disorder characterized by a set of signs and symptoms that usually occur together, including seizure type, etiology, anatomy, precipitating factors, age of onset, severity, chronicity, relationship to the circadian cycle, and sometimes prognosis.

FIS: Known as Flashing light stimulation, stimulation that occurs by n strobe that causes flashes of light, brief every 10-15 seconds. Especially useful for activating electroencephalographic recording and for the diagnosis of photosensitive epilepsies.

Hemiparesis: decreased motor force or partial paralysis affecting an arm and leg on the same side of the body. Consequence of the presence of hemiconvulsion-hemiplegia syndrome.

Hemiplegia: disorder of the body in which the counter-lateral half of the body is paralyzed. Consequence of the presence of hemiconvulsion-hemiplegia syndrome.

Hyperventilation: consists of inhaling and exhaling deeply for a few minutes. Very useful technique in the assessment of the crisis of childhood absence.

Hypsarrhythmia: slow activity characterized by slow waves of very high voltage, random, with peaks and focal sharp waves.

Hemorrhagic stroke: A stroke caused by the rupture of a blood vessel.

Idiopathic: No known cause or reason

Idiopathic Epilepsy: Epilepsy with seizures determined by alterations in genes, in which no alterations are found to justify seizures.

Ischemic stroke: A stroke caused by a lack of blood supply in a certain area of the CNS.

Paroxysmal activity: sudden increase in brain electrical activity, which may be normal or abnormal, depending on whether or not there are neurological symptoms.

Seizures: Transient occurrence of signs and symptoms arising from excessive or synchronous abnormal activity of neuronal activity. Phenomena that occur suddenly, transient, motor, sensory-motor, or psychic.

Stroke: Stroke.

Secondary or symptomatic epilepsy: Epilepsy that is due to a brain injury such as a tumor or scar on the brain or by some brain damage produced at birth.

Nystagmus: rapid and involuntary movements of the eyes that can be from one side to the other (horizontal nystagmus) up and down (vertical nystagmus) and rotational (rotational or torsional nystagmus).

Semiology: part of medicine that studies the symptoms of diseases.

Symptoms: indication or sign of a disease and serves to determine its nature. The symptoms of epilepsy are epileptic seizures, a seizure, loss of consciousness, absence, etc.

Sign: Something that is identified during a physical exam or lab test. For example, the sign of the four which is an asymmetrical tonic posture of the upper extremities at the beginning of the generalization phase in a secondarily generalized focal seizure.

Synaptopathies: Diseases of the brain related to malfunction of synaptic junctions

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Resources

Web

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Terms about epilepsy. https://www.apiceepilepsia.org/glosario-terminos-la-epilepsia/