Seizures in Childhood

Dr.Jafar Nasiri

Associate professor of child neurology

Isfahan University of Medical Science

Definition

- **A seizure or convulsion is a :**

-paroxysmal,

- time-limited

change in motor activity and/or behavior that results from abnormal electrical activity in the brain

ETIOLOGY AND EPIDEMIOLOGY

-Seizures are common in the pediatric age group and occur in ≈١٠% of children

-Most seizures in children are provoked by somatic disorders originating outside the brain, such as:

high fever, infection, head trauma, hypoxia, toxins,…

epilepsy

- **epilepsy** is considered to be present when two or more unprovoked seizures occur at an interval greater than ٢٤ hr apart.

-Epilepsy is a condition in which seizures are triggered recurrently from within the brain

-Less than one third of seizures in children are caused by epilepsy

Causes of Seizures

- **Perinatal Conditions**
- Cerebral malformation
- Intrauterine infection
- Hypoxic-ischemic
- Trauma
- Hemorrhage
- **Infections** :Encephalitis, Meningitis, Brain abscess
- **Metabolic Conditions**
- Hypoglycemia
- Hypocalcemia

  Hypomagnesemia
- Hyponatremia
- Hypernatremia
- Storage diseases
- Reye syndrome
- Degenerative disorders
- Porphyria
- Pyridoxine dependency and deficiency
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Causes of Seizures

Poisoning
Lead
Cocaine
Drug toxicity
Drug withdrawal
Neurocutaneous Syndromes
Tuberous sclerosis
Neurofibromatosis
Sturge-Weber syndrome
Klippel-Trenaunay-Weber syndrome
Linear sebaceous nevus
Incontinentia pigmenti
Systemic Disorders
Vasculitis
SLE
Hypertensive encephalopathy
Renal failure
Hepatic encephalopathy
Other
Trauma*
Tumor Febrile*
Idiopathic*
Familial

Types of seizures

- International League Against Epilepsy (ILAE) operational classification of seizure types divides epileptic seizures into four categories based on the presumed mode of seizure onset:
- **focal**: initial activation of a system of neurons limited to part of one cerebral hemisphere
- **generalized:** the first clinical and EEG changes indicate synchronous involvement of all of both hemispheres
- **unknown onset:** there is not enough clinical information available to determine if the seizure is focal or generalized
- **unclassified:** If the clinical characteristics of a seizure are unusual and a determination of onset cannot be made despite an adequate workup, the seizure may be labeled as unclassified

Focal seizures

- **Focal seizures** constitute ٤٠% to ٦٠% of the classifiable epilepsies of childhood

-Focal brain lesions (tumors, infarct, dysgenesis) may cause focal epilepsies,

but:

-most focal seizures in children are due to genetic influences (rolandic seizures).

-An aura consisting of vague, unpleasant feelings, epigastric discomfort, or fear is present in approximately one third of focal seizures

-The presence of an aura always indicates a focal onset of the seizure

Focal seizures…

- **Focal with retained awareness:**
  - with no alteration in consciousness
  - arise from a specific anatomical focus and may or may not spread to surrounding brain regions
  - Clinical symptoms include motor (tonic, clonic, myoclonic), sensory, psychic, or autonomic abnormalities

- **Focal seizures with impaired awareness:**
  - with altered awareness of the surroundings
  - Along with altered responsiveness, patients may have automatisms or stare during these seizures
  - Automatisms are automatic semipurposeful movements of the mouth (lip smacking, chewing) or extremities (rubbing of fingers, …)

Focal with retained awareness

Focal seizures with impaired awarenes

- Impaired consci
- automatism

Generalized Seizures

- Generalized seizures arise from both sides of the brain simultaneously
- alteration of consciousness

-Generalized Seizures :

- Tonic-Clonic
- Tonic
- Clonic
- Myoclonic
- Atonic
- Absence

GENERALIZED TONIC-CLONIC SEIZURES

Patients sudde
emit a shri

Their eyes

tonic cont

Clonic j

Abs

- hallmark of abse
  accompanied by
  automatisms, su
  smacking
- Differentiating a
  staring seizures
- Atypical absenc
  impaired consci
  phenomena, and
  opening, eye dev

Myoclonic seizure

- Myoclonus is a sudden
- not all myoclonus is d
- Nonepileptic myoclonu myoclonus

Epileptic syndromes

The epileptic syndromes represent clinical entities where in the clinical event, EEG pattern, natural history and prognosis are consistent and uniform

Common epileptic syndromes:

-Benign focal epilepsy (benign rolandic epilepsy, benign centrotemporal epilepsy)

-Juvenile myoclonic epilepsy

-Infantile spasms (West syndrome)

-Lennox-Gastaut syndrome

-Acquired epileptic aphasia (Landau-Kleffner syndrome)

-Benign neonatal convulsions

Benign childhood epilepsy with centrotemporal spikes, also known as benign Rolandic epilepsy

- is among the most common epilepsy syndromes and usually begins between ages ٥ and ١٠ years
- The seizures typically occur only during sleep or on awakening
- Affected children usually have focal motor seizures involving the face and arm (abnormal movement or sensation around the face and mouth, drooling, impaired speech and swallowing)
- the epilepsy resolves after puberty

Juvenile Myoclonic Epilepsy

- is the most common generalized epilepsy among adolescents and young adults
- Onset is typically in early adolescence with myoclonic jerks (exacerbated in the morning, often causing the patient to drop objects), generalized tonic-clonic seizures, and absence seizures
- Seizures usually resolve promptly with antiseizure medication

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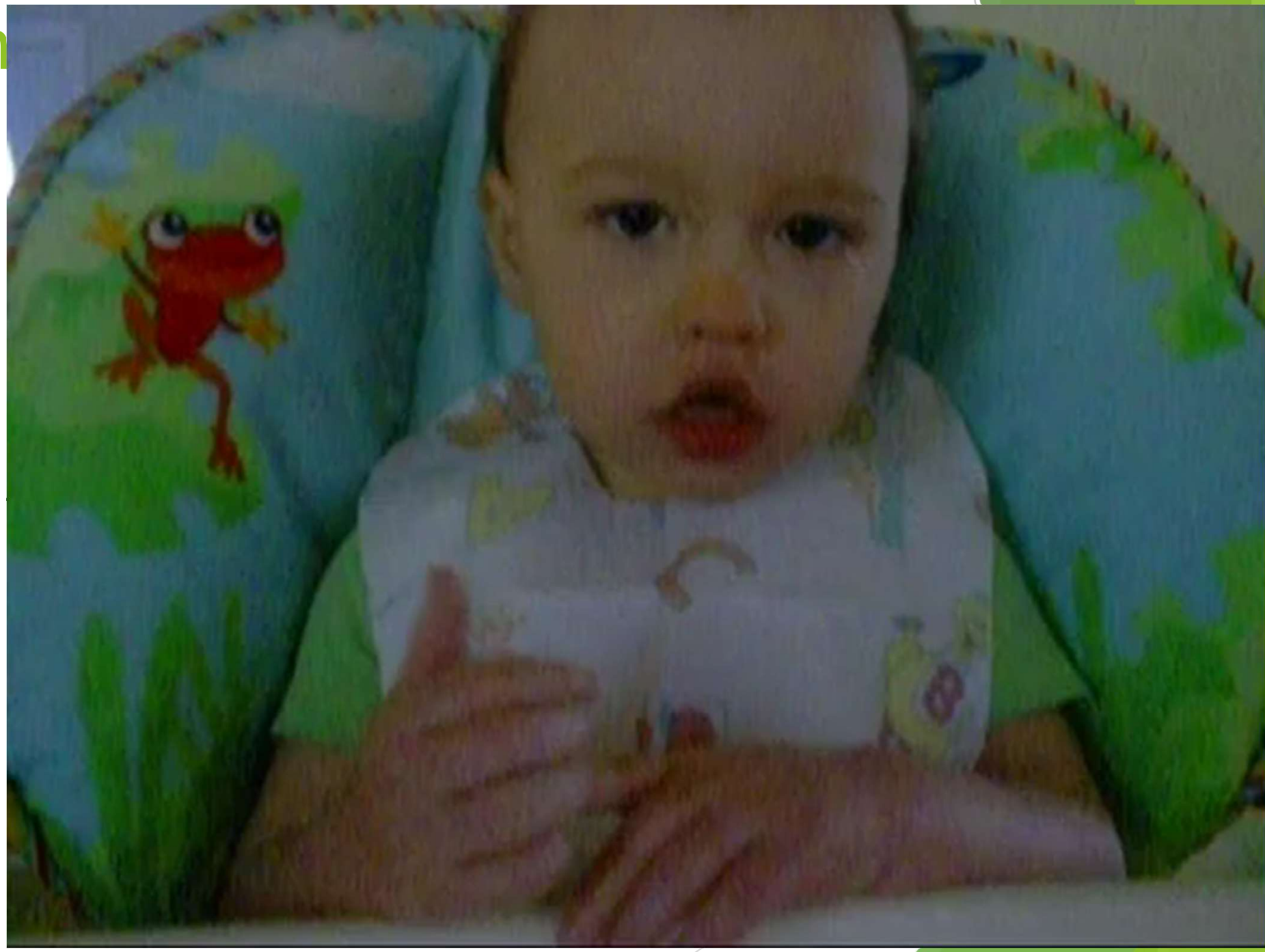

Lennox-Gastaut syndrome

- a severe epilepsy syndrome
- Frequent, multiple seizure types including atonic, focal, atypical absence, and generalized tonic, clonic, or tonic-clonic seiure may be observed
- Many children have underlying brain injury, malformations, or genetic etiologies
- The seizures are typically difficult to control, and most patients have significant intellectual disability

Acquired epileptic aphasia (Landau-Kleffner syndrome)

- is characterized by the abrupt loss of previously acquired language in young children
- The language disability is an acquired cortical auditory deficit (auditory agnosia)
- The EEG is highly epileptiform in sleep, the peak area of abnormality often being in the dominant perisylvian region (language areas)
- This diagnosis should be considered for young patients with clear autistic regression, as it is a potentially treatable entity

Febrile seizures

- a common genetic predisposition to seizures in febrile disease
- the most common cause of seizures among children between ۶ months and ۶ years of age, occurring in about ۴% of all children
- The prognosis of children with simple febrile seizures is excellent
- If the seizure has focal features, lasts longer than ۱۵ minutes, recurs within ۲۴ hours, or the child has preexisting neurological challenges, the seizure is referred to as a complex febrile seizure
- Seizures in the setting of fever may be caused by central nervous system infections (meningitis, encephalitis, brain abscess) or unrecognized epilepsy triggered by fever

psychogenic nonepileptic seizures (PNES)

- may be the manifestation of conversion disorders or malingering
- children with epilepsy may, consciously or subconsciously, exhibit concurrent PNES
- In PNES, the patient's eyes are often closed (typically eyes are open during epileptic seizures) and the movements are tremulousness or thrashing rather than tonic or clonic
- Verbalization and pelvic thrusting are seen more commonly in PNES, urinary and fecal continence is usually preserved, and injury does not usually occur