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ILAE classification of seizures and antiepileptic medications apothegmatic: hereafter advancement and clinical practice

Abstract

Introduction: The Antiepileptic medications are frequently categorized into divisions such as 'first-generation' (i.e., carbamazepine, phenobarbital, phenytoin, primidone, and valproate) and 'second-generation' (lamotrigine, levetiracetam, felbamate, gabapentin, topiramate, tiagabine, oxycarbazepine, zonisamide, and pregabalin). Chronic phenytoin ingestion leads to its impact in the cerebral cortex, resulting in atrophy of cerebellum, cause ataxia and nystagmus.

Objective: To recapitulate the International league against epilepsy classifications, first treatment for epilepsy based on their classifications, antiepileptic medications adverse drug reaction,

Methodology: The author used 74 distinctive published articles for the accomplishment of this review article. Google search engine was used for accessing published articles from databases like Google Scholar, Research Gate, PubMed, NCBI, NDSS, PMID, PMCID, Cochrane Database and CLINMED international library.

Findings: Tonic-clonic is characterized by stiffness for loss of consciousness occurred by tonic extension and rhythmic clonic contractions of all considerable muscle groups. Antiepileptic drugs are implicitly an effective treatment for patient with epilepsy. Carbamazepine cause serious and sometimes fatal dermatologic reactions, including toxic epidermal necrolysis and stevens-johnson syndrome, aplastic anemia and agranulocytosis, Suicidal Behavior and Ideation, Stevens johnson syndrome, cholestatic jaundice, ataxia, xerostomia, speech disturbances, feeling sleepy

Conclusion: Commonly happening side-effects of AEDs are memory troubles, exhaustion, tremors, gastrointestinal symptoms, osteoporosis, depression, drowsiness, dizziness, weight change, nausea. In generalized seizures, on the other hand, the seizure is generalized from the endeavor (i.e., primary generalized seizures), launching in both hemispheres of the brain contemporaneously.

Keywords: Antiepileptic Medications, Apothegmatic, Clinical Practice, ILAE Classifications, Seizures

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Gudisa Bereda
Department of Pharmacy, Negelle Health Science College, Guji, Ethiopia

Correspondence: Gudisa Bereda, Department of Pharmacy, Negelle Health Science College, Guji, Ethiopia, Tel +251919622717/+251913118492, Email gudisabareda95@gmail.com

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Introduction

Epilepsy is a chronic neurologic disorder characterized by repeated epileptic seizures attacks which result from paroxysmal uncontrolled discharges of neurons within the central nervous system. The definition of epilepsy requires the circumstance of slightlysingle epileptic seizure. Epilepsy is a chronic disorder of the brain and is unique of the most common severe neurological abnormalities leading fifty million people existing in all parts of the world without limit to age, race, social class, nationality, or geographical location.[1] Anti-epileptic medications are implicitly an efficient management for patient with epilepsy. Treatment failure and poorcompliance are, nevertheless, extremely ordinary in patient expertise adverse drug reactions owing to anti-epileptic medications. Comparatively twenty five percent of the patients, anti-epileptic medications influence to management withdrawn and have anoutstanding, antipathetic impress on the marvelous of life.[2-5] The AEDs are frequently categorized into divisions' such like '1st-generation' (i.e., carbamazepine, phenobarbital, phenytoin, primidone, and valproate) and '2nd-generation' (lamotrigine, levetiracetam, felbamate, gabapentin, topiramate, tiagabine, oxycarbazepine, zonisamide, and pregabalin)[6,7] of anti-epileptic medications. Commonly happening adverse drug reactions of anti-epileptic medications are mind troubles, exhaustion, shake, GI problems, bone break easily, state of feeling sad, sleepy, light-headed, weight change, vomiting.[8] These perhaps necessitate medical management grading from a junior intermediating to intensely priceless specialist care and hospital admission. Besides to those healthcare charges, patient and parents charges (i.e. unconventional care) and charges in distinctive areas (example. unemployment) can be indispensable.[9-15] Categorization of epileptic seizures is depending on electroencephalogram results combining with the clinical results of the seizure concerns. The foremost division in this categorization is into partial seizures and generalized seizures. In the partial seizures the anomalous electrical discharges launch in a localized area of the brain. The clinical manifestations are based on which section of the brain is affected. Those discharges perhaps stay localized, or they perhaps disseminate to distinctive sections of the brain and then the seizures become generalized (2^{ndry} generalized seizures). In generalized seizures, in the other way, the seizure is generalized from the onset (i.e., 1^{ry} generalized seizures), launching in both hemispheres of the brain concurrently.[16]

Partial seizures

When the seizure commences in a localized area of the brain, it is delineated as partial.[17]

Simple

The long-suffering will have a perception or unrestrained muscle shifting of a part of their body without are vamp in consciousness. The class of perception or movement is depending on the emplacement of seizure in the brain.[18-20]

Complex

Not with standing the seizure is localized in a particular area of the brain, like a simple partial seizure, this seizure cause a changing in the patient degree of consciousness. There is an aura, an extraordinary sensing in the stomach retrograde to the throat and head, or a perception of light, smell, sound or taste. There is a slow rehabilitation later a complex partial seizure, with a period of confused. Later the strike there is comprehensive unable to remember things of it.[21,22]

Partial seizures secondarily generalized

Seizures that launch as a simple or complex partial seizure and disseminate to enclose the whole brain. Patient perhaps chronicle a caution or aura, and those are frankly the resume of the seizure.[23,24]

Primary generalized seizures

If the whole cerebral cortex is enclosed in the seizure from the onset of the seizure, the seizure is categorized as 1^{ry} generalized.[25,26]

Tonic-clonic: Characterized by stiffness for loss of consciousness attended by tonic extension and rhythmic clonic contractions of all considerable muscle classes. The duration of the seizure is ordinarily one to three minutes. That seizure is frequently defined as "grand mal..[27,28]

Absence: Stiffness and brief (i.e., many seconds) loss of consciousness without muscle movements. These seizures are frequently defined as daydreaming or blanking out episodes. A common term for these seizures is "petit mal." It is unexpectedly over, and the children persists what he was doing prior to the seizure came. The children have not mind of these seizures. They should not be confused with brief complex partial seizures.[29,30]

Myoclonic: Single and extremely all considerable muscle classes. Patients with these perhaps not lose consciousness, due to the seizure lasting <three to four seconds. They perhaps single jerks, or jerks repeated over extended periods or Patients perhaps define these seizures as shoulder shrugs or spinal chills.[31,32]

Atonic: The patient losses loses consciousness and muscle tone. No muscle movements are commonly signified. They are thereupon also called "drop attacks". There is loss of consciousness, stiffness for onset and no post-ictal phase. The patient stands up and persists what he was doing. It so appears that loss of tone solely influences a section of the body; particularly the head with a head drop or nod.[33-37]

Tonic seizures: Is stiffness for sustained muscle contractions, fixing the limbs in certain strained location. There is instantaneous loss of consciousness. Frequently there is a divergence of the eyes and head towards one side, occasionally rotation of the whole body. Tonic seizures are a recognized sign/symptoms of frontal lobe epilepsy particularly commenced in the auxiliary motor cortex.[38-40]

Clonic seizures: These seizures are generalized seizures, where the tonic component is not available, only repetitive clonic jerks (clonic jerks are repetitive rhythmic flexing and stretching of limbs). When the prevalence expresses the amplitude of the jerks do not.[41,42]

Generalized tonic-clonic seizures (GTCS): The patient loses consciousness, falls down, occasionally with a scream, and advances a generalized stiffness (the tonic phase). Breathing ceases, as all the muscles of the trunk are in spasm, and the patient becomes cyanotic, the head is taken back, the arms flexed and the legs extended. Beyond the muscle stiffening and jerks is loss of consciousness, sphincter control and post ictal confusion.[43-45]

Infantile spasms: These are characterized by stiffness for flexion of limb and truncal muscles and ordinarily appear in series or they are flexor spasms of the head, bending of the knees and flexion with abduction of the arms. They appear in the 1st year of life, and are sophisticated to manage. They are a fingerprint presentation of the west syndrome which presents in infancy unceasing to early childhood.[46-48]

Note: Adrenocorticotropic hormone or prednisolone is the drug of choice for infantile spasms.

Therapeutic intention in epilepsy treatment is complete seizure control without excessive side effects. AEDs are chemically and pharmacologically distinctive, having in common only their capability to inhibit seizure activity without impairing consciousness.[49,50]

All anticonvulsant medications are associated with adverse effects which perhaps importantly jounce on fantabulous of life, kick in to non-compliance and in rare circumstances be implicitly life-threatening.[51-54]

Common side effects of some anti-epileptics medications

Diazepam: Cause respiratory depression, hypotension, drowsiness, dizziness, muscle weakness, headache, dry mouth, constipation, ataxia (loss of control of body movement), somnolence, confusion.[55-57]

Phenobarbital: Cause behavioral problems, hyperactivity, sedation is major side effect, dementia, loss of appetite, tiredness, dizziness, drowsiness.[58,59]

Phenytoin: Causesedation, psychosis, hyperkinesias, megaloblastic anemia, decreased serum folate degree, gingival hyperplasia (overgrowth of the gums), IGA deficiency, lowered bone mineral composition, liver disease, acne, hirsutism (excessive hair on the face/body/overgrowth of hair), coarseness of facial features, unsteady or shaky, atrophy of cerebellum, cause ataxia and nystagmus, gingival hypertrophy perhapscharacterized to changed collagen metabolism. Changed metabolism of sex steroid hormones by phenytoin can initiatehyperandrogenic symptoms like hirsutism and nodular skin lesions, diplopia (cerebrovascular dysfunction), exfoliative dermatitis and toxic epidermal necrosis, lupus-like syndrome.[60,61]

Valproic acid: cause severe weight gain, tremors in a part of your body or unusual eye movements, stomach pain, dry or sore mouth, sluggishness, yellowish eyes or skin, low platelet count (clotting abnormalities), hair loss, fatal hepatotoxicity (children under 2years), incidence of neural tube defects in fetus, liver impairment.[62]

Carbamazepine: cause severe solemn and occasionally fatal dermatologic reactions, involving toxic epidermal necrolysis and stevens-johnson syndrome, aplastic anemia and agranulocytosis, Suicidal Behavior and Ideation, Stevens johnson syndrome, cholestatic jaundice, ataxia, xerostomia, speech disturbances, feeling sleepy, weight gain, drowsiness is the most common side effect, diplopia, vertigo, hyponatremia.[63,64]

Ethosuximide: cause weight loss, stomach upset, dizziness, drowsiness, loss of coordination, blurred vision.[65-67]

Lamotrigine: cause double vision, blurred vision, loss of balance or coordination, uncontrollable movements of the eyes, difficulty thinking or concentrating, difficulty speaking, drowsiness, skin rashes and headaches are the most common side effects, dark urine, stomach pain, throat irritation, dry mouth, insomnia, multiorgan failure, hepatic failure.[68]

Levetiracetam: cause feeling sleepy, blocked nose/itchy throat, headache are the most common side effects, drowsiness, dizziness, low energy, decreased appetite, generalized weakness, psychosis, feeling aggressive, infection.[69,70]

Topiramate: cause feeling sleepy, dizziness, diarrhea, feeling are the most common side effects, acute close angle glaucoma, heat stroke, weight loss, coordination problems, numbness/tingly in the hands or feet, drowsiness, tiredness, kidney stones.[71]

Oxycarbazepine: cause symptomatic hyponatremia, dizziness, drowsiness, abdominal pain, trouble sleeping, headaches, constipation, double vision.[72-74]

Table 1 Indications for the antiepileptic drugs for absence seizure and their common side effects

Absence seizure	Medication		Site of action	Side effects
Stiffness and jerking (i.e., several seconds) loss of consciousness without muscle movements	1st line	Ethosuximide,	Block T-channel Ca^{2+}	Hepatoxicity, sedation, rash
		valproate	Block Na channel	Weight gain, drowsiness, hepatoxi- city, tremor
		Levetiracetam	Unknown	Depression, psychotic episodes,
	2nd line	Lamotrigine	Block Na channel	Somnolence, Dizziness, rash
		clonazepam	Enhance GABA activity	Memory impairment, sedation

Table 2 Indications for the antiepileptic drugs for tonic-clonic seizure and their common side effects

Tonic clonic	Medication		Site of action	Side effects
Further the muscle stiffening and jerks is loss of consciousness, sphincter control and post ictal confusion.	1st line	Valproic acid	Block Na channel	Hepatoxicity, tremor, osteoporosis
		carbamazepine	Block Na channel	Diplopia, aplastic anemia, drowsiness
		phenytoin	Block Na channel	Diplopia, gingival hyperplasia, hirsutism, sedation
	2nd line	Lamotrigine	Block Na channel	Rash, insomnia, ataxia, sedation
		Phenobarbital	Enhance GABA activity	Dizziness, sedation

Table 3 Indications for the antiepileptic drugs for partial seizure and their common side effects

partial	Medication		Site of action	Side effects
When the seizure commences in a localized area of the brain	1st line	carbamazepine	Block Na channel	Diplopia, sedation, leucopenia
		phenytoin	Block Na channel	Diplopia, sedation, hirsutism
		Topiramate	Block Na channel	Acute glaucoma, oligohidrosis
	2nd line	Phenobarbital	Enhance GABA activity	Ataxia, sedation, drowsiness,
		Tiagabine	Enhance GABA activity	Dizziness, somnolence

Table 4 Indications for the antiepileptic drugs for atonic/clonic seizure and their common side effects

Atonic/myoclonic	Medication		Site of action	Side effects
The patient loses consciousness /Single and very brief jerks of all major muscle groups.	1st line	Valproic acid	Block Na channel	Pancreatitis, hepatotoxicity
		Topiramate	Block Na channel	Behavioral problems,
	2nd line	Phenobarbital	Enhance GABA activity	Ataxia, sedation, osteoporosis
		clonazepam	Enhance GABA activity	Memory impairment, ataxia

Conclusion

Epilepsy is a chronic disorder of the brain and is unique of the most common severe neurological abnormalities leading fifty million people existing in all parts of the world without limit to age, race, social class, nationality, or geographical location.Categorization of epileptic seizures is depending on electroencephalogramresults combining with the clinical results of the seizure affairs. The foremost division in this categorization is into partial seizures and generalized seizures.Absence means stiffness and brief (i.e., many seconds) lossof consciousness without muscle movements.Adrenocorticotropic hormone or prednisolone is the drug of choice for infantile spasms. Phenobarbital causesbehavioral problems, hyperactivity; sedation is major side effect, dementia, loss of appetite, tiredness, dizziness, drowsiness.

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