



## AN OVERVIEW ON DIAGNOSTIC AND MANAGEMENT APPROACH OF EPILEPSY IN PRIMARY HEALTH CARE CENTRE

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### ABSTRACT

Epilepsy is considered to be one of the most common and disabling diseases, yet we still do not have a sufficient understanding of the detailed pathophysiology of this condition and, as well as the treatment rationale for much of epilepsy. This article reviews the clinical aspects of epilepsy and seizure intending to provide physicians an insight into the aspects that might be tractable to scientific investigations. Epilepsy is defined, diagnostic methods are reviewed, and aspects of differential diagnosis, different clinical conditions are discussed, prognosis and treatment are considered to help neuroscientists to formulate translational research questions. In this review, we will discuss the etiologies, pathophysiology, subtypes, clinical manifestations, and treatment options for epilepsy. Searching PubMed database to find relative articles about epilepsy using the terms "Epilepsy." The early detection of seizures and investigations of their etiologies is crucial to prevent early and late complications of this disorder and to improve the quality of life of patients.

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### Introduction

Paroxysmal spells may represent events happening in the nervous system, psychiatric causes, cardiac disturbances, or can be related to other etiologies. Convulsive concussion, movement disorders, syncope, rigors, psychogenic nonepileptic seizures, and sleep-related event can all be among the possible differential diagnosis of a transient event with movements. Epileptic one cause of these paroxysmal events [1]. Epileptic seizures are transient occurrences with signs or symptoms related to synchronous and excessive activity. Epilepsy is a clinical neurological disorder that is quite common in all age groups. It is characterized by having repetitive, unprovoked episodes of seizures. Seizures are abnormal alterations of brain signals caused by the high rate of neuronal firing in the brain [1].

There are different types of epilepsy is approximately 1% of seizures. Generalized and partial are the two main classifications of seizures. In partial seizures, a part of the cortex gets initially triggered and shows some minor signs, like a corporeal or motor occurrence. In some cases, they quickly become generalized and span to affect all cortical areas. On the other hand, generalized seizures are defined as a diffuse cortical activity since the beginning of the onset of the seizure. Partial-onset seizures with rapid secocaryation are considered to be the most common type of seizures in adults [2]. Complex seizures cause

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altered cognitive signs and are linked with loss of consciousness or a differentiated mental status. Complex present with negligible motor features, like small-amplitude extremity movements or lip-smacking [2].

## Results and Discussion

Epilepsy is defined as a disease of unprovoked recurrence. It is essential to determine the nature and cause of the initial seizure whether it was pre-empted or not for future management and care [3]. Epileptic syndromes help to serve medical data into beneficial nomenclatures. For the indication of seizures that occur because of pathology in confined brain areas, localization terminology is put in use. Seizures are the main symptoms that link to Idiopathic epilepsy. Epilepsy, seizures are related to an identifiable disease. Cryptogenic seizures that occur secondary to an underlying brain disease seizures can be broadly classified into partial and generalized depending on the area of the brain that is affected [3]. Partial seizures occur in more than half of cases of epilepsy. Partial seizures can be further classified into simple and complex [3]. The difference between simple and complex seizures is the effect on consciousness and cognition. In a simple sub-type, the consciousness is intact while in a complex sub-type the consciousness is either partially or completely impaired. In simple partial seizures, the patient can have sensory, motor, and/or autonomic symptoms depending on the area of the brain that is affected. On the other hand, generalized seizures are further classified, according to the clinical manifestations they present with, into no definitive proof of the underlying etiology [3]. Status epilepticus is known as an enduring epileptic disease. Status epilepticus has some different classifications. One of them is classified as a clinical emergency, Generalized convulsive status epilepticus. Existing designations of status epileptics are either a full series of generalized convulsions without coming back to complete cognizance or one that lasts longer than five minutes [4].

### *Epidemiology*

The prevalence ranges are adjusted to age from 2.2 in 1000 to 41 in 1000, which differs depending on the country that is reporting. Over 65% of the cases of epilepsy are of partial classification. Incidence increases more in populations with lower socioeconomic status. Around 25% to 30% of the newly diagnosed cases of seizures are considered to be related to another etiology if not incited [5]. Epilepsy occurrence is at its most in the young generation rising steadily after the age of 50 years. The most popular cause of epilepsy and seizures in senior patients is Cerebrovascular disease [6].

### *Pathophysiology*

The concept behind a seizure threshold is that every person has a susceptibility threshold to seizures with multiple elements determining it, including prescriptions, electrolyte abnormalities, genetic factors, brain swelling, infections, sleep state, or wounds from different causes that can lead to the surpassing of this level causing a seizure [3]. A seizure starts with innervation of the vulnerable brain neurons resulting in the asynchronous release of larger and larger neuron groups with the involvement of neurotransmitters [3]. Glutamate is the most important irritator neurotransmitter, whereas gamma-aminobutyric acid (GABA) is a major neurotransmission repressor. A discrepancy with a surplus of excitatory neurotransmitters or a decrease in the inhibitory neurotransmitters may trigger an abnormal electrical activity which leads to epileptic form activity. Clinical symptoms of the seizure are exhibited by the area that is affected in the brain [3].

Generalized status epilepticus is commonly followed by system differences indicated by lactic acidosis, increased catecholamine levels, respiratory compromise, hyperthermia, and additional systemic changes [7]. Nonetheless, the increased electrical activity which takes place with status epilepticus is dangerous for the parenchyma of the brain [8].

### *Diagnosis*

Early detection and diagnosis of epilepsy help in improving outcomes and decreasing the risk of developing short-term and long-term complications [3]. Multiple investigations can be done when suspecting epilepsy, and they include electroencephalogram (EEG), single-photon emission computed tomography (SPECT), magnetic resonance imaging (MRI), computed tomography (CT) scan, positron emission tomography (PET), and testing of the genetics. EEG is believed to be the best method to establish the diagnosis of epilepsy [1]. It can show the type of epilepsy by identifying which brain area/hemisphere is involved, which can help physicians to target the most useful therapy for the patient. All other imaging modalities listed above can help to detect epilepsy and can aid in the confirmation of diagnosis. For the majority of healthy patients who have returned to baseline from the first seizure, determining serum glucose and sodium is needed. In women of childbearing age, pregnancy testing is recommended as well [1]. Commonly additional neuroimaging and labs are necessary. Electroencephalography (EEG) is essential to be obtained in epilepsy. Generalized or focal epileptic form discharges constitute the EEG hallmark of seizure activity [1].

### *Treatment*

Patients with reversible aetiologies of seizures, such as electrolyte disturbances, hypoglycaemia, or medications, may be discharged after the needed interventions and consideration for the safety of the patient [9]. For a returning epilepsy patient with a standard mental state, calibration of the medications with subsequent visits to a clinical officer is necessary [9]. Treatment testing of compliance by measuring the medication levels may be necessary when available for a particular antiepileptic medication. In cases of non-compliant patients, medications are to be resumed. In case of an alcohol withdrawal

seizure, patients may be discharged after the appropriate treatment and observation—patients with [9]. In cases of an adult who has returned to the normal neurological baseline after the first episode of an unprovoked seizure, do not necessitate the initiation of treatment [3]. Patient counseling regarding the involvement in hazardous activities should be discussed, and the patient should be followed up in the outpatient setting. When treating epilepsy, there are various options for the treatment of epilepsy. Medication selection is guided in consultation with a neurologist and by side effects. Medications are according to the action mechanism. Sodium channel blockers (oxcarbazepine, carbamazepine, lamotrigine, fosphenytoin, phenytoin, zonisamide, eslicarbazepine, and lacosamide), GABA receptor agonists (Barbiturates and Benzodiazepines), GABA acceptance inhibitors, resistors of GABA-transaminase, like vigabatrin, Glutamate antagonists (felbamate, topiramate, perampanel), drugs that have multiple mechanisms (gabapentin, pregabalin, valproic acid), and medications with binding to synaptic vesicle 2A protein (levetiracetam, brivaracetam) [1, 3].

For generalized status epilepticus patients, a speedy remedy of the seizure is required whilst stabilizing the patient and performing additional diagnostic processes [10]. Accommodating care with special concentration to breathing, air path, and circulation complications is necessary. The first-line medications in these conditions are mainly diazepam and some other Benzodiazepines including midazolam and lorazepam [10]. A common side effect for Benzodiazepines is respiratory problems. Therefore patients require careful monitoring. Benzodiazepine underdosing is common, and the physician must make sure that a sufficient benzodiazepine dose is issued before the addition of another dose of medications [10].

- Midazolam 10 mg IV or IM, repeated in 5 to 10 minutes if the seizure continues.
- Diazepam 10 mg IV, if the seizure continues add another dose in 10 minutes.
- Lorazepam 4 mg IV, if the seizure continues add another dose in 5-10 minutes.

The gold standard second-line treatment is vague regardless of the completion of a huge and indiscriminate trial about benzodiazepine refractory status epilepticus in the established status epilepticus treatment trial (ESETT). Second-line treatment may contain valproate, levetiracetam, fosphenytoin among additional ones. Clinicians reported similar incidences of side effects of the medication with none being particularly better than the other [11].

#### *Complications*

Acute complications include hyperthermia, cardiac and respiratory deficits, CNS damage (i.e., cortical necrosis), subsequent seizure, the patient might bite the tongue, break the glenohumeral joint; Postictally, there will be an increased risk of transient anion gap metabolic acidosis. About 60-70% of patients diagnosed with epilepsy respond to medical treatment and show improvement in function [12, 13].

#### **Conclusion**

Epilepsy is a common neurological disorder that is characterized by unprovoked seizures, which are abnormal brain firing impulses. Epilepsy can be classified into different types depending on clinical features and imaging results. The majority of epilepsy can be controlled by anti-epileptic medications. Early recognition and diagnosis are important and can improve patients' quality of life. Exact pathophysiology with all its details is not yet fully understood and is a very good area for further exploration [1].

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