# Epilepsy

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## DEFINITION/EPIDEMIOLOGY

*Epileptic seizures* are defined as a transient occurrence of signs and/or symptoms due to abnormal excessive or synchronous neuronal activity in the brain. Seizures are a common sign of brain dysfunction. A wide variety of symptoms can occur depending on the brain networks involved including involuntary movements, abnormal sensations and behaviors, and impaired consciousness.

Seizures often occur during the course of medical or neurological illnesses in which brain function is temporarily deranged (symptomatic seizures) (Table 118-1). The most common secondary causes of seizures are metabolic derangements (such as hypoglycemia or hyponatremia), intoxications (alcohol, cocaine), acute head trauma, and hypoxic-ischemic conditions (cardiac arrest, syncope, embolic stroke). Symptomatic seizures are usually self-limited and recurrent seizures do not occur after the underlying disorder is corrected. Thus, symptomatic seizures do not constitute epilepsy.

*Epilepsy* is a chronic disease of the brain characterized by an enduring predisposition to generate epileptic seizures. The diagnosis of epilepsy requires the occurrence of at least one epileptic seizure, but typically is not applied unless there are at least two unprovoked seizures occurring more than 24 hours apart or one unprovoked seizure and a high probability of further seizures based on additional data such as an epileptiform EEG. The phrase *seizure disorder* is synonymous with the word, epilepsy. Individuals with epilepsy have increased seizure susceptibility (lowered seizure threshold). Genetic factors and prior brain injury (from a multitude of causes) are the major contributors to this susceptibility. The diagnosis of epilepsy encompasses the neurobiological, cognitive, psychological, and social consequences of this condition.

There are many different *epilepsy syndromes* (the epilepsies) with the three major categories being focal epilepsy, idiopathic (genetic) generalized epilepsy, and symptomatic generalized epilepsy (discussed later). Classification of the epilepsy syndrome depends on a number of factors, including the seizure type, etiology, genetic mutations, neuroimaging, and response to therapy.

The care of people with seizures suffers from imprecise terminology usage. The word "epilepsy" is a noun, as in, "a person with epilepsy." The word "epileptic" is an adjective, as in, "an epileptic seizure." An individual with epilepsy should not be labeled as an "epileptic." That is, from the psychosocial perspective, people with epilepsy are more than just an enduring predisposition to seizures and their consequences. Epilepsy is thought of as a disorder, but, to emphasize the impact of the recurrent seizures, epilepsy should be considered a disease. Epileptic seizures, also referred to as electrical seizures, are distinct from nonepileptic (or nonelectrical) seizures, which have a psychological basis and are best referred to as psychogenic nonepileptic attacks (less appropriately termed pseudoseizures; see later). Most seizures in someone with epilepsy occur in an unpredictable fashion. It is this unpredictable timing that results in the major negative impact of epilepsy on quality of life. If functionally impairing seizures occur during waking hours *(diurnal seizures)* then activity restrictions are required, including restriction from driving, operating heavy machinery, climbing heights, and unobserved swimming or bathing (showering with a good drain should be advised). These activity restrictions lead to loss of independence. The psychological impact of having intermittent involuntary loss of body control and the dependency imposed by the activity restrictions are major contributors to the increased incidence of comorbid depression in people with epilepsy (up to 50%).

In many people with epilepsy there are more seizures during sleep due to increased synchronization of neuronal activity. Seizures that occur exclusively in sleep constitute *nocturnal epilepsy*. In women with epilepsy (WWE), seizures sometimes occur more often during the week around menses or at ovulation *(catamenial epilepsy)*. Sleep deprivation, alcohol consumption, infectious illnesses, certain medications, and severe emotional stressors can

**TABLE 118-1 CAUSES OF SYMPTOMATIC SEIZURES***

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| **ACUTE ELECTROLYTE DISORDERS** |
| Acute hyponatremia (<120 mEq/L) |
| Acute hypernatremia (>155 mEq/L) |
| Hyperosmolality (>310 mOsm/L) |
| Hypocalcemia (<7 mg/dL) |
| Hypoglycemia (<30 mg/dL) |
| **DRUGS** |
| Quinolone antibiotics, isoniazid, penicillins (in renal insufficiency) |
| Theophylline, aminophylline, ephedrine, phenylpropanolamine, terbutaline |
| Tramadol, lidocaine, meperidine (in renal insufficiency) |
| Tricyclic antidepressants |
| Cyclosporine |
| Cocaine (crack), phencyclidine, amphetamines; alcohol withdrawal |
| **CENTRAL NERVOUS SYSTEM DISEASE** |
| Hypertensive encephalopathy, eclampsia |
| Hepatic and uremic encephalopathy |
| Sickle cell disease, thrombotic thrombocytopenic purpura |
| Systemic lupus erythematosus |
| Meningitis, encephalitis, brain abscess |
| Acute head trauma, stroke, brain tumor |

*The metabolic derangements and drugs listed in Table 118-1 also lower the seizure threshold in people with epilepsy.