# *WHAT IS EPILEPSY?*

***A seizure is a paroxysmal self-limited event caused by an excessive electrical discharge of the central nervous system. Epilepsy is a disorder characterized by recurrent seizures. All of us have a lifetime risk of having a single seizure of approximately 8.8%. The prevalence of epilepsy is however approximately 0.65%.***

***A seizure is a frightening event for families and friends, but for patients it may engender a certain degree of confusion and reluctance to seek attention. They are often amnestic for the event, and the consequences of a diagnosis of "epilepsy" are serious. In one's approach to diagnosis and management one must not only draw upon our collective knowledge of the pathophysiology of seizures but upon our abilities to humanely guide and counsel anxious patients. The consequences of a diagnosis and treatment must be weighted against the risks of recurrent seizures.***

***Seizure Classification***
***Partial Seizures***
***Simple***
***Complex***

***Generalized Seizures***
***Absence***
***Typical***
***Atypical***
***Myoclonic***
***Atonic***
***Tonic***
***Clonic***
***Tonic-Clonic***

***Seizures are a symptom of disturbance of cerebral gray matter. Only neurons can generate enough electrical activity to produce the clinical symptoms of epilepsy. Seizures may be triggered or initiated by external forces: cardiac arrhythmias, bypotension, hypoglycemia, trauma, infection, fever, toxic exposure. When they are recurrent and secondary to intrinsic cerebral cortical activity it is called epilepsy.***

***There are several classifications based on the epilepsy syndrome or the clinical semiology of the individual seizure. A functional and therefore practical classification is based on the area of brain in which the seizure starts. There are two major seizure types PARTIAL AND GENERALIZED.***

***Partial seizures start in one are or "part" of the brain. If consciousness is maintained it is a simple partial seizure. If consciousness is impaired it is a complex partial seizure. Partial seizures may spread to involve the contralateral hemisphere becoming secondarily generalized.***

***Generalized seizures may be convulsive (tonic, clonic, tonic clonic, atonic, myoclonic), or non convulsive staring called absence. These seizures are thought to arise simultaneously and bilaterally from large areas of cortex. Consciousness is always lost.***

***PARTIAL SEIZURES***

***Simple partial seizures may be characterized by involuntary movements of onelimb or sensory disturbances of one part of the body all the while the patient is aware of what is occurring. We categorize the types of simple partial seizures by their manifestations and can thus infer their cerebral origin.***

***Simple partial seizures may evolve into a complex partial seizure in which the patient's consciousness is impaired. The forms vary widely depending on which region of the brain is involved but commonly involve staring, repetitive semi-purposeful movements and tonic posturing. The eyes are commonly deviated and the patient is unresponsive to verbal commands and resistant to physical manipulation.***

- ***Such seizures frequently are heralded by a subjective warning or aura. Auras generally take the forms described in simple partial seizures. They are generally very brief lasting seconds. They can be isolated but usually evolve into a complex partial seizure.***
- ***The aura is followed by the externally recognizable seizure activity or ictus, which as it resolves leaves the***

*patient in an abnormal state of fatigue or confusion called the postictal period.*

- *The ictus typically involves an alteration of consciousness in which though posture is maintained there is usually a cessation of motor activity. The patient then usually demonstrates automatisms involuntary, repetitive and semi-purposeful activity. There are several "classic" forms.*
- *Oral-facial-lingual movements such as lip smacking, repetitive swallowing, usually seen in mesial temporal lobe origin seizures.*
- *Repetitive limb movements, fiddling, rubbing, rearranging or ordering objects, even undressing.*
- *Ambulatory or walking and circling movements.*
- *Vocalizations such as tuneless humming, grunting or whistling.*

*Partial seizures may progress and become secondarily generalized with bilateral tonic clonic rhythmic jerking movements of the limbs, unresponsiveness, tongue or cheek biting, occasional incontinence. When this occurs rapidly it is often difficult to differentiate from a primarily generalized seizure.*

## *GENERALIZED SEIZURES*

### *Generalized tonic clonic*

*Primarily generalized seizures may be convulsive or non-convulsive. Convulsive seizures are what most people think of when they thing of epilepsy. They usually involve bilateral and symmetrical rhythmic movements in an unconscious patient. The patient may be generally stiff or tonic. With this stiffening there may be a forced exhalation and a vocalization. The patient will fall if standing. There may be a brief period of tonic flexion followed by axial rigidity and extension of the torso with adducted arms and clenched jaw and fists. They may tremble or seem to vibrate. This stiffening generally gives way after 10 to 30 seconds to rhythmic, clonic, bilateral body movements. Patients often flex violently (clonic), or jerk rhythmically tonic clonic (grand mal). During this phase they are unresponsive, and their tidal volume is modest. Cyanosis may be*

*seen peri-orally. They are unable to swallow thus oral secretions pool. Saliva may be blood tinged due to biting of the tongue or cheek. Bowel or bladder incontinence may occur. The clonic jerking tends to decrease in frequency and increase in amplitude. This activity seldom lasts more than a minute or two and is followed by relaxation, continued unresponsiveness and an apparent deep sleep. This phase usually lasts from 2 to 30 minutes. When patients awaken they are universally confused. The confusion usually lasts longer than the convulsive phase but is quite variable lasting from minutes to hours. The patient often falls into a deep sleep awakening in minutes to hours often tired and generally feeling sore and stiff. Patients are often amnestic for event only recognizing the seizure afterwards but the way they feel.*

*TYPICAL ABSENCE*

*Generalized seizures may also be non-convulsive. In typical absence seizures patients will suddenly stop participating in their activities, stare blankly as if frozen. Tone is preserved and the person does not fall. Occasionally there is a fine flutter of the eyelids or lips. The event lasts seconds, 80% of the time less than 10, and the patient generally resumes their previous activity and is amnestic for the event. They may occur many times per day. Often occurring in clusters when awakening or falling asleep. Fatigue, photic stimulation or hyperventilation are common precipitants. Typical absence develops in childhood and may or may not be the only seizure type in an individual. These events are accompanied by 3 per second spike and wave abnormalities on EEG are what is classically referred to as "petit Mal" epilepsy. This term is unfortunately commonly used by non neurologists to refer to all seizures that are not convulsive.*

*ATYPICAL ABSENCE*

*These seizures differ from the typical absence in that the onset and cessation are less abrupt, and the duration is longer. There may be loss of or changes in tone tonic or clonic movements and the EEG is irregular and abnormal both intericatally and ictally with slow or faster spike wave complexes than the typical 3 per second seen in typical absence.*

## *MYOCLONIC SEIZURES*

***These are characterized by brief shock like contractions of a muscle group resulting in a twitch or jerk in which the patient may drop an object or stumble and fall. The ictal EEG demonstrates generalized or poly-spike and wave discharge. Myoclonic seizures may be induced by various environmental activities or may be a component of a variety of seizure disorders such as Lennox-Gastaut syndrome and progressive myoclonic epilepsies.***

## *CLONIC SEIZURES*

***These seizures are characterized by jerking usually irregular and asymmetrical. The ictal EEG is fast, mixed with large amplitude slow waves. They are most often seen in neonates, infants or young children.***

## *TONIC CLONIC SEIZURES*

***These seizures are characterized by a tonic (stiffening) muscle contraction with an alteration of consciousness. There is no clonic or rhythmic jerking phase. Classically the patient's neck is extended and the facial muscles contract so that the eyes are open though the orbits roll upwards (Bell's phenomenon). The chest muscle contract and a gasp or cry is often heard followed by apnea as there is no relaxation or intake of air until the seizure is over. The proximal arm muscles contract and the arms are abducted, semi-flexed and rise above the level of the shoulders. The legs may be extended or flexed. There may be some brief partial relaxation and the patient may have some fluctuation of the spasm with a kind of nodding and change in rigidity of the limbs. Such seizures usually last less than 60 seconds.***

## *ATONIC SEIZURES*

***These seizures are characterized by a sudden loss of postural tone and the patient falls to the ground like a sack of potatoes. At times the event is less pronounced with only a brief buckling of the knees or forced nodding of the head. The duration is very brief and recovery immediate. They may occur in clusters and are usually seen in persons with significant and diffuse cerebral damage.***

## *FEBRILE CONVULSIONS*

***The seizures are by definition convulsions occurring during a febrile illness in a child between the ages of 6 months to 3 years. Their prevalence is 3% in the general population but higher 14% in siblings of children with febrile convulsions and slightly higher in children or parents with epilepsy, 5%. Persons with febrile convulsions are at increased risk for the development of epilepsy, 7% by the age of 26 years. This risk appears to be associated with recurrent febrile convulsions within the same illness. Those which last more than 15 minutes, and those with lateralizing features. In a study of adults presenting with their first seizure a history of febrile convulsions was associated with a 50% chance of recurrence within 5 years.***