

Seizure Types - Clinical Correlation and EEG Findings

1) PARTIAL SEIZURES

a) SIMPLE PARTIAL

- i) FOCAL MOTOR
 - (1) Focal spike activity over corresponding brain area
 - (2) Clinical symptoms are contralateral to the focus and vary depending on location on the motor strip
 - (3) No postictal period except for Todd's Paralysis (postictal transient paralysis)
 - (4) Jacksonian seizure shows focal spiking which will spread along with the marching effect
 - (5) Adversive seizure the head and eyes will turn away from the side of the lesion and after the seizure, head and eyes will deviate towards the side of the lesion (postictal phenomenon)
- ii) SENSORY
 - (1) Symptoms depend on the location in the sensory strip
 - (2) No clinical manifestations, just sensations. It can remain focal or spread like Jacksonian
 - (3) No loss of consciousness
 - (4) No postictal period
 - (5) Visual, the patient can see flashes of light or colors
 - (6) Auditory, the patient can hear roaring, whistling, humming or buzzing
 - (7) Olfactory, the patient can smell unpleasant odors
 - (8) Gustatory, the patient can have an unpleasant taste
- iii) AUTONOMIC
 - (1) Patient can become pale and experience vomiting, flushing, tachycardia or dizziness
- iv) PSYCHIC
 - (1) Patient can experience a feeling of déjà vu, fear or transient loss of time, place, or person
- v) EEG FINDINGS
 - (1) Interictal EEG can show focal spikes or sharp waves with or without focal slowing
 - (2) Ictal EEG can show rhythmic, hypersynchronous beta (13-30Hz). Amplitude will progressively increase as frequency decreases. Rhythmic activity gradually replaced by spike and wave activity
 - (3) Postictal EEG can show slowing

2)

a) COMPLEX PARTIAL

- (1) The most complex and bizarre of all seizure types.
- (2) The patient will have an alteration or a loss of consciousness and will not respond to stimuli
- (3) The patient will not be able to recall the event
- (4) Automatisms such as lip smacking, chewing, repeated opening and closing of drawers, fumbling with clothes or having crude or vulgar speech
- ii) EEG FINDINGS
 - (1) Interictal EEG findings can show temporal spikes (usually in the temporal electrodes), focal sharp waves, focal spike and wave complexes or focal slowing
 - (2) Ictal EEG findings can show sustained rhythmic spikes or sharp waves with rhythmic slowing, rhythmic slow waves, 10-30 Hertz fast activity or spike and wave complex
 - (3) Postictal EEG findings can show localized or generalized slowing

3) GENERALIZED SEIZURES

a) TONIC-CLONIC (GRAND MAL)

- i) Seizure begins with an immediate loss of consciousness with NO aura
- ii) Increase in heart rate and blood pressure, cyanosis (blue/gray skin color) and diaphoresis (sweating)
 - (1) TONIC PHASE
 - (a) Flexed extremities followed by muscular tension, back may arch and the eyes can deviate upward. May let out an "epileptic cry." A tremor will precede the clonic phase
 - (2) CLONIC PHASE
 - (a) Patient will exhibit an alternating muscle contraction and relaxation (rhythmic jerk).
 - (b) The jerks slowly diminish
 - (c) Patient may have urinary or fecal incontinence
 - (d) Patient may bite their tongue
 - (3) POSTICTAL PHASE
 - (a) The postictal phase can last from 5-15 minutes or longer
 - (b) Patient will show signs of confusion, drowsiness and may be combative

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iii) EEG FINDINGS

- (1) Interictal EEG can be completely normal OR shows bursts of generalized spike and wave, multiple spike and wave, sharp and slow wave complexes
- (2) Ictal EEG will show initial bursts of generalized multiple spike and wave complexes. During the Tonic phase there can be desynchronization of the background for up to 3 seconds and 10 hertz surface negative spikes with duration of approximately 10 seconds. The jerks tend to occur simultaneously to the spikes
- (3) Clonic phase can show slow waves intermixed with the 10hz spikes, rhythmic jerks associated with spikes, muscular relaxation will be associated with the slow waves and as the jerks decrease in frequency the spike and wave will diminish
- (4) Postictal EEG will show a flattening of the EEG followed by low voltage delta that will gradually increase in frequency and voltage the delta can persist for up to one week after the seizure

b) ABSENCE SEIZURE (PETIT MAL)

- i) The patient will become non-responsive and if eyes are open they will have a blank stare. May notice an upward deviation of the eye or a twitch that corresponds to the EEG discharge
- ii) The patient will have an interruption of their behavior during the seizure but will return to full attention immediately after the seizure
- iii) The patient will not have an aura and there is no postictal period
- iv) These seizures usually last from 5-15 seconds and can vary from 1-100 a day!
- v) EEG FINDINGS
 - (1) Interictal and Postical EEG - normal
 - (2) Ictal EEG - paroxysmal 3 per second generalized spike and slow wave; high voltage (100-300uV)

c) MYOCLONIC SEIZURES

- i) The patient will exhibit sudden and brief (usually less than 100msec) single or multiple muscles contracting every few seconds
- ii) MYOCLONIC SEIZURE EEG FINDINGS
 - (1) Generalized paroxysmal burst of multiple spike and wave complexes

d) ATONIC SEIZURES (DROP ATTACKS)

- i) Patient experiences a loss of muscle tone which can range from a head nod to the body falling to the floor
- ii) No loss of consciousness, no postictal state and rare auras
- iii) EEG FINDINGS - Paroxysmal discharges ranging from slow spike and wave, rhythmic slowing, multiple spike and wave and or hypersynchronous activity

e) TONIC SEIZURES

- i) This type of generalized seizure is activated by non-REM sleep
- ii) Patient will have a loss of consciousness
- iii) Brief episodes of increased muscle tone which may be limited to particular muscle groups
- iv) EEG FINDINGS - Generalized paroxysmal fast activity (GPFA), frontocentral 15-25 hertz beta occurring in paroxysms of 1-9 seconds followed by electrodecremental periods

f) CLONIC SEIZURES

- i) This seizure produces an altered consciousness in the patient with rapid bilateral myoclonic jerks and occurs often during non-REM sleep
- ii) EEG FINDINGS - Bursts of generalized spike and wave

g) STATUS EPILEPTICUS

- i) This type of seizure can be generalized OR partial and may occur in all seizure types
- ii) Status is defined as one seizure beginning before a preceding seizure has ended.
- iii) Status epilepticus can be life threatening!
- iv) Status can be convulsive or non-convulsive
- v) EEG is the only clear cut way to prove a non-convulsive status situation is present

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References: Larry Head Institute EEG Board Prep Manual