Typical Seizures

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Table 1. Classification of seizures[a]

- Generalized seizures
  - Tonic–clonic (in any combination)
  - Absence
    - Typical
    - Atypical
    - Absence with special features
      - Myoclonic absence
      - Eyelid myoclonia
  - Myoclonic
    - Myoclonic
    - Myoclonic atonic
    - Myoclonic tonic
  - Clonic
  - Tonic
  - Atonic
- Focal seizures
- Unknown
  - Epileptic spasms

Berg et al, *Epilepsia*, 2010

Generalized Epileptic Seizures

- **Absence Seizures**
- **Generalized Convulsive Seizures**
- **Generalized Tonic Seizures**
- **Atonic Seizures**
- **Generalized Myoclonic Seizures**

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Absence Seizures

- Typical
  - Abrupt onset and offset of altered awareness
    - Clonic movements of eyelids, head, eyebrows, chin, perioral or other facial parts may occur, most typically at 3Hz.
    - Myoclonus of limbs can rarely occur.
    - Oral and manual automatisms are common
    - Individual absence seizure longer than 45 seconds or with a post-ictal phase consider focal seizure.
  - Ictal EEG
    - Regular 3 Hz generalized spike-and-wave
  - Related syndromes
    - CAE, JME, JAE, GEFS+, Dravet syndrome, Epilepsy with myoclonic-atonic seizures, Epilepsy with myoclonic absences

Absence Seizures

- Atypical
  - Less abrupt onset and offset of loss of awareness than typical
    - Often associated with other features such as loss of muscle tone of the head, trunk or limbs and subtle myoclonic jerks.
    - The loss of awareness may be minimal with the patient continuing an activity, but more slowly or with mistakes.
  - Ictal EEG
    - Slow (<2.5 Hz) generalized spike-and-wave discharges
  - Related syndromes
    - LGS, Dravet syndrome, Epilepsy with myoclonic-atonic seizures, Epilepsy with myoclonic absences

Generalized Convulsive Seizures

- Bilateral and symmetric
  - Variants with asymmetry including head and eye deviation can be seen.
  - Clonic/Tonic-clonic/Clonic-tonic-clonic seizures
- Ictal EEG
  - Often obscured by artifact
  - Tonic stage: Generalized fast rhythmic spikes
  - Clonic stage: bursts of spikes and after-coming slow waves synchronous with clonic jerks
- Related syndromes
  - CAE, JME, JAE, Epilepsy with GTCS alone, GEFS+, Dravet syndrome, LGS, Epilepsy with myoclonic-atonic seizures, Epilepsy with myoclonic absences

Generalized tonic seizures

- Bilaterally increased tone of the limbs lasting seconds to a minute.
  - They often occur out of sleep and in runs of varying intensity of tonic stiffening
  - Although asymmetry can occur in a generalized tonic seizure, if consistent, consider focal seizure involving the frontal lobe.
  - Tonic seizures are one type of seizure that can result in a "drop attack"
- Ictal EEG
  - Diffuse or generalized accelerating low amplitude paroxysmal fast activity, which is often bilateral and predominates in the anterior and vertex regions.
- Related syndromes
  - LGS, Epilepsy with myoclonic-atonic seizures

Atonic Seizures

- Sudden loss or diminution of muscle tone without apparent preceding myoclonic or tonic features
  - Very brief (<2 seconds) and may involve the head, trunk or limbs.
  - One type of seizure that can result in a "drop attack"
- Ictal EEG
  - Generalized spike-and-wave
- Related syndromes
  - LGS, Epilepsy with myoclonic-atonic seizures

Generalized Myoclonic Seizures

- A single or series of jerks (brief muscle contractions)
  - Each jerk is typically milliseconds in duration.
  - One type of seizure that can result in a "drop attack"
- Ictal EEG
  - A generalized spike-and-wave or polyspike-and-wave
- Related syndromes
  - JME, PME, LGS, Dravet syndrome, Epilepsy with myoclonic-atonic seizures

Focal Seizures

- **By features**
- **Hemispheric lateralization**
- **Lobar localization**

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By features

- Aura
- Motor
  - Elementary
    - Convulsive, myoclonic, tonic, epileptic spasm, versive, dystonic
  - Complex
    - Hypermotor
      - proximal limb or axial muscles, producing irregular large amplitude ballistic movements
    - Negative
    - Automatism
      - Oroalimentary
      - Gestural
      - Gelastic
      - Vocal/Verbal
      - Dacrystic
  - Focal seizure evolving to a bilateral convulsion
  - Epilepsia partialis continua

Hemispheric Lateralization

- Contralateral hemisphere
  - Unilateral ictal clonic activity or ictal dystonia
  - Early forced head version
- Ipsilateral hemisphere
  - Post-ictal nose-wiping
  - Unilateral eye-blinking
- Dominant hemisphere
  - Ictal aphasia
  - postictal dysphasia
- Non-dominant hemisphere
  - Ictal speech
  - Ictal vomiting
  - Preserved awareness during ictal automatisms

Lobar lateralization

- Frontal lobe
  - Motor features are prominent
    - hypermotor thrashing attacks with pelvic thrusting and bipedal automatisms to asymmetric tonic posturing.
  - Typically brief, and can have prominent vocalization, bizarre behavior, urinary incontinence, and head and eye deviation.
  - Exclusively nocturnal and often cluster

Lobar lateralization

- Frontal lobe
  - Subtypes
    - Primary sensorimotor cortex
      - Localized convulsive, tonic or myoclonic activity, Jacksonian march
      - Unilateral tingling, Negative motor features
    - Supplementary sensorimotor cortex
      - Abrupt onset and offset of asymmetric tonic posturing, lasting 10-40 seconds with minimal postictal confusion
    - Orbitofrontal cortex
      - Dyscognitive features, initial repetitive gestural automatisms, olfactory hallucinations and illusions and autonomic signs
    - Frontopolar cortex
      - forced thoughts, dyscognitive features, initial ipsilateral head and eye version, autonomic features and axial convulsive movements resulting in falls.
    - Dorsolateral frontal cortex
      - Aphasia or dysphasia
    - Cingulate cortex
    - Fronto-parietal operculum

Lobar lateralization

- Temporal lobe
  - Behavioral arrest with loss of awareness
  - Automatisms: oro-alimentary and/or gestural
  - Autonomic features: pallor and palpitations.
  - Postictal confusion
  - Hemispheric lateralization
  - Subtypes
    - Mesial temporal lobe including hippocampus
    - Lateral / neocortical temporal lobe

Lobar lateralization

- Parietal lobe
  - Subtypes
    - Primary sensory area (Post-central gyrus)
    - Non dominant parietal cortex
    - Secondary sensory area (parietal upper bank of the sylvian fissure)
    - Parieto-occipital junction
    - Paracentral lobule
    - Dominant parieto-temporal region
    - Fronto-parietal operculum

Lobar lateralization

- Occipital lobe
  - Visual aura
  - Oculomotor features: Forced eye closure, eyelid fluttering, eye deviation and nystagmus
  - Subtypes
    - Primary visual cortex
      - Elemental visual auras (Positive/Negative), Usually brief (< 2 minutes)
    - Extra-striate cortex
      - More complex formed visual hallucinations
    - Parieto-occipital junction
      - Epileptic nystagmus
    - Inferior to the calcarine fissure
      - Spreading to the temporal lobe
    - Superior to the calcarine fissure
      - Spread to the parietal lobe, fronto-parietal operculum or frontal lobes.