بسم الله الرحمن الرحيم

رب أوزعنى أن أشكر نعمتك التى انعمت على
وعلى والدى وأن أعمل صالحا ترضاه وأدخلنى
برحمتك فى عبادك الصالحين

صدق الله العظيم

سورة النمل آيه 19

Epilepsy

"Once sacred disease"

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- Definitions
- Epidemiology
- Aetiology
- Classification
- Differential diagnosis
- Investigations
- Strategy for treatment
- Status epilepticus

Definitions

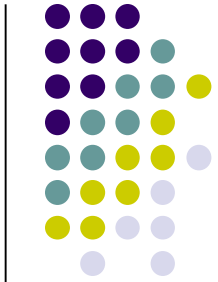
- **Seizure (Convulsion)**

  Clinical manifestation of abnormal excessive synchronized electrical discharges of a group of brain neurons.

- **Epilepsy**

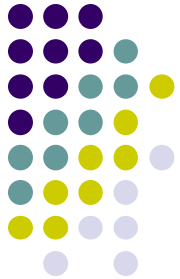
  - Present when 2 or more unprovoked seizures occur at an interval greater than 24 hours apart

Definitions



- **Provoked seizures**
  - Seizures induced by somatic disorders originating outside the brain
    - E.g. fever, infection, syncope, head trauma, hypoxia, toxins, cardiac arrhythmias

Definitions



- **Status epilepticus (SE)**

  Continuous convulsion lasting longer than 30 minutes OR occurrence of serial convulsions between which there is no return of consciousness.

- **Idiopathic SE**

  Seizure develops in the absence of an underlying CNS lesion/insult.

- **Symptomatic SE**

  Seizure occurs as a result of an underlying neurological disorder or a metabolic abnormality.

Epidemiology of Seizures and Epilepsy

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- **Seizures**
  - Incidence: 80/100,000 per year
  - Lifetime incidence: 9%

- **Epilepsy**
  - Incidence: 20-50/100,000 per year
  - Prevalence: 4-10/1000.

Etiology of Seizures and Epilepsy

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- **Infancy and childhood**
  - Prenatal or birth injury
  - Inborn error of metabolism
  - Congenital malformation

- **Childhood and adolescence**
  - Idiopathic.
  - Genetic syndrome
  - CNS infection
  - Trauma

Etiology of Seizures and Epilepsy

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- **Adolescence and young adult**
  - Head trauma
  - Drug intoxication and withdrawal*
- **Older adult**
  - Stroke
  - Brain tumor
  - Acute metabolic disturbances*
  - Neurodegenerative

*causes of acute symptomatic seizures, not epilepsy

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Seizure Precipitants (cont.)

Metabolic and Electrolyte Imbalance

- Low blood glucose
  (or high glucose, esp. w/ hyperosmolar state)
- Low sodium
- Low calcium
- Low magnesium

Metabolic abnormalities and seizures

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Type	Comment
Hyponatremia	Osmotic shifts, liver disease, nephrotic syndrome
Hypo- or hyperkalemia	Rare to cause seizure. Sometimes through hypomagnesemia
Hypo- or hypercalcemia	Usually other seizures first, such as tetany or altered consciousness
Hypoglycemia	BS <50, disrupted Na/K pump
Hyperthyroidism	May exacerbate epilepsy but rarely is de novo cause

BS = blood sugar.

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Seizure Precipitants (cont.)

Stimulants/Other Pro-convulsant Intoxication

- IV drug use
- Cocaine
- Ephedrine
- Other herbal remedies
- Medication reduction

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Seizure Precipitants (cont.)

Medications that can lower seizure threshold

- Antidepressants: Bupropion, Tricyclics
- Neuroleptics: Phenothiazines, Clozapine
- Theophylline
- Isoniazid
- Penicillins
- Cyclosporin
- Meperidine
- **Antiepileptic medication reduction or inadequate AED treatment**

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Seizure Precipitants

- Sleep deprivation
- Hormonal variations
- Stress
- Fever or systemic infection
- Concussion and/or closed head injury

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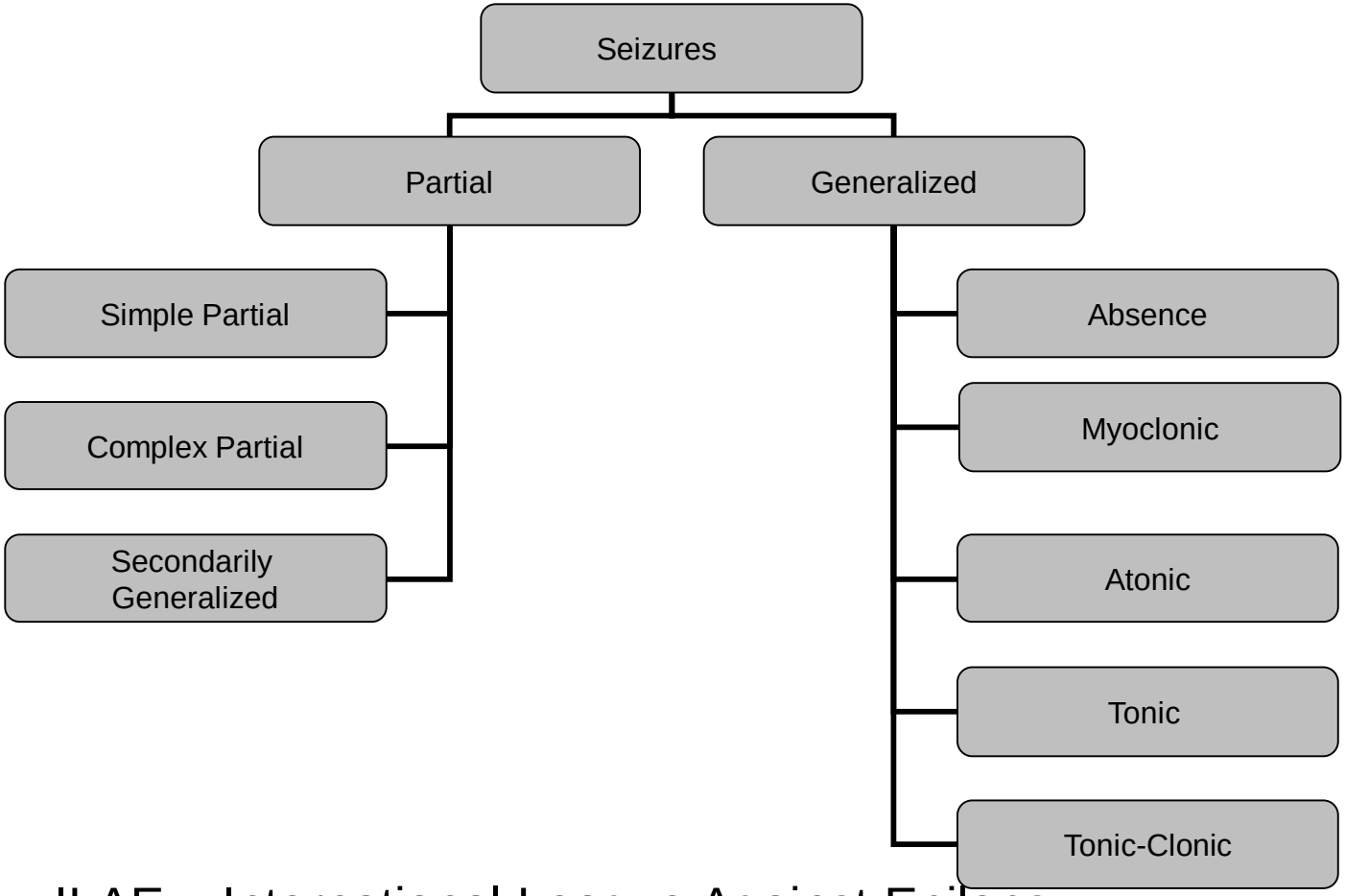
ILAE Classification of Seizures



ILAE – International League Against Epilepsy

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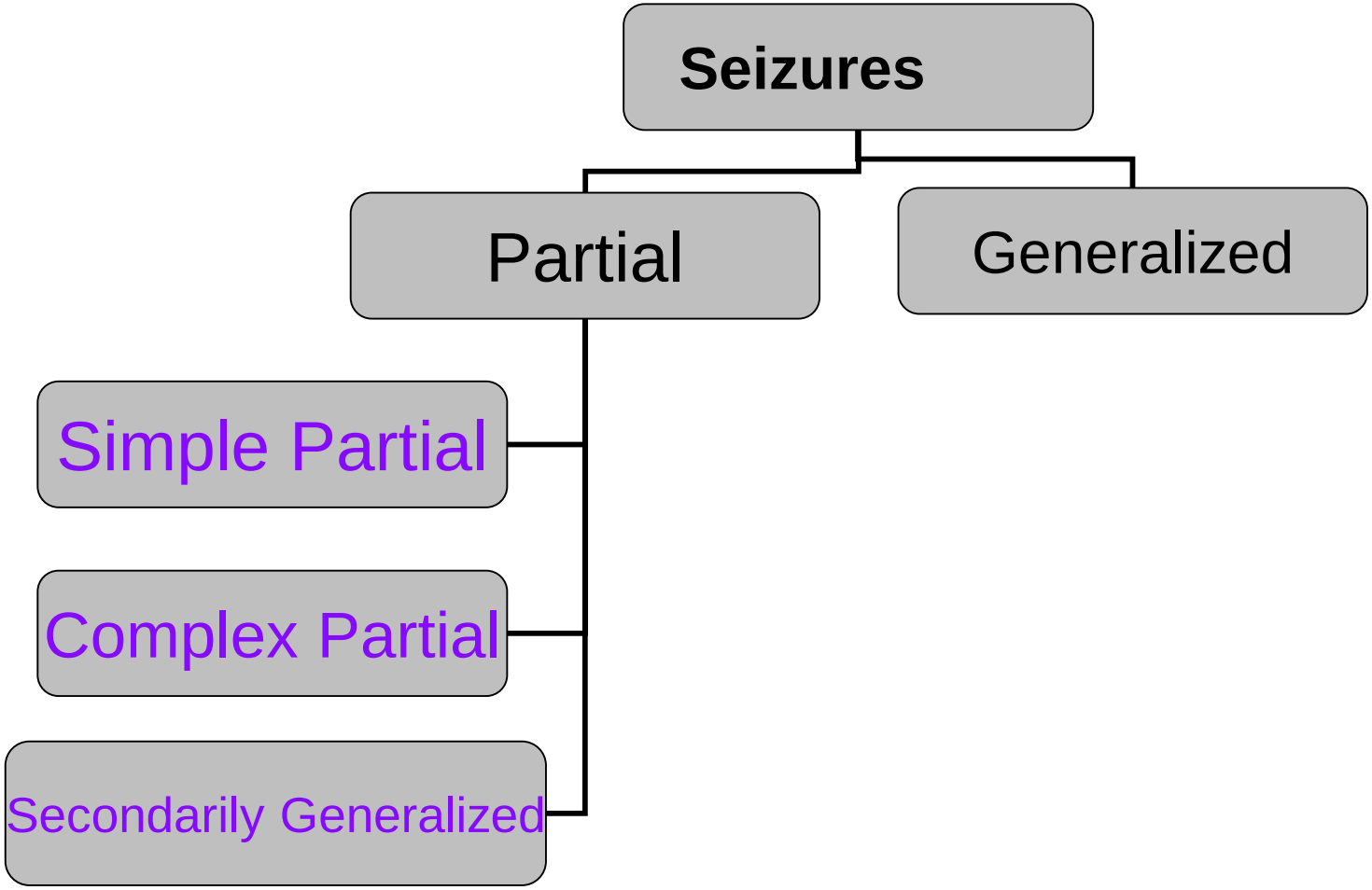
ILAE Classification of Seizures



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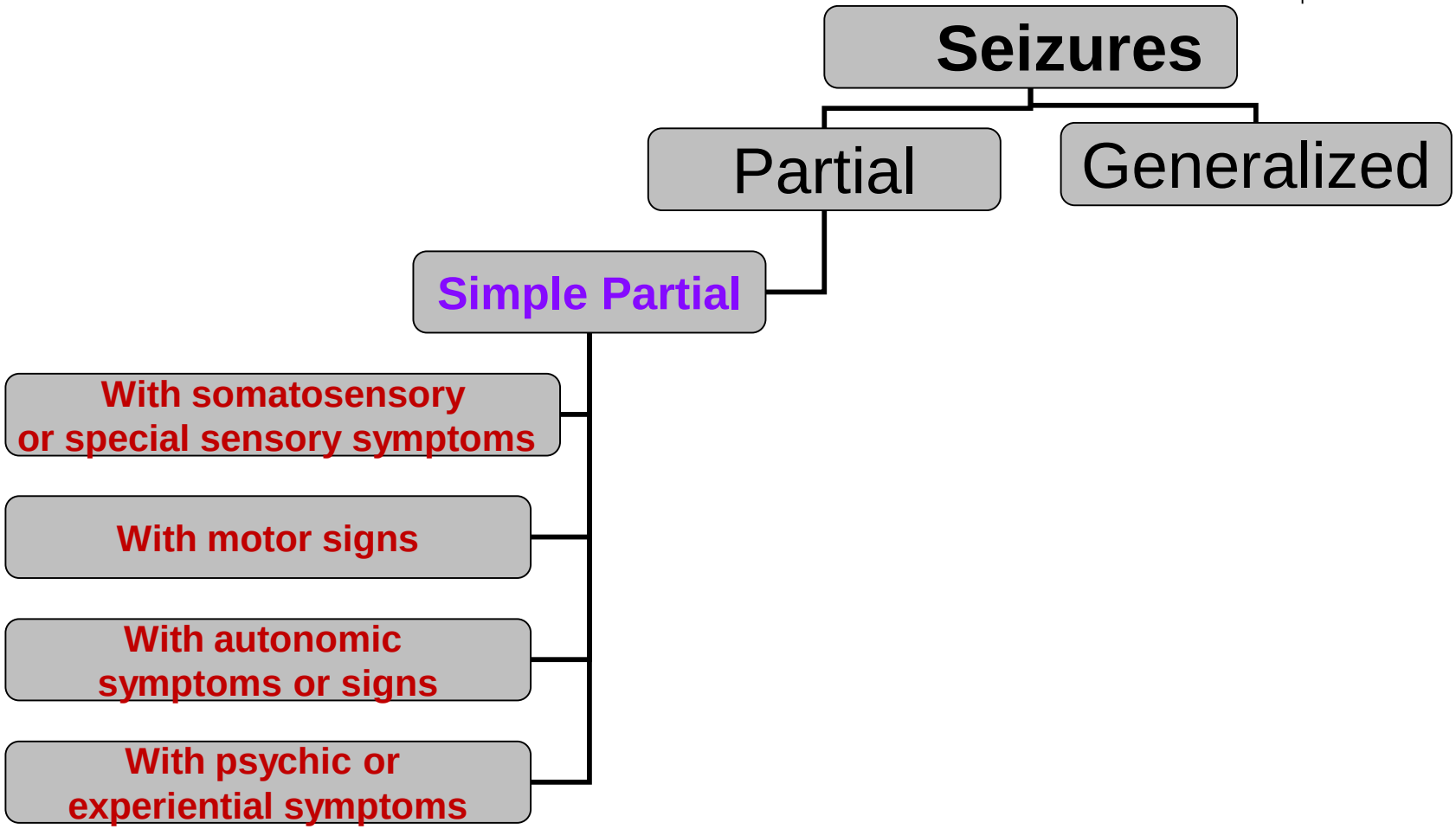
ILAE Classification of Seizures



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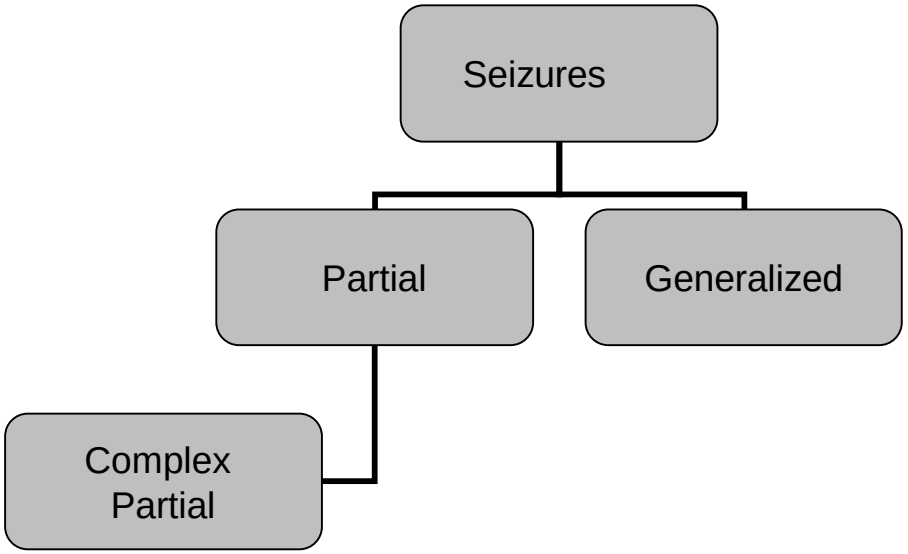
Complex Partial Seizures

- Impaired consciousness
- Clinical manifestations vary with site of origin and degree of spread
  - **Presence and nature of aura**
  - **Automatisms**
  - **Other motor activity**
- Duration typically < 2 minutes



Secondarily Generalized Seizures

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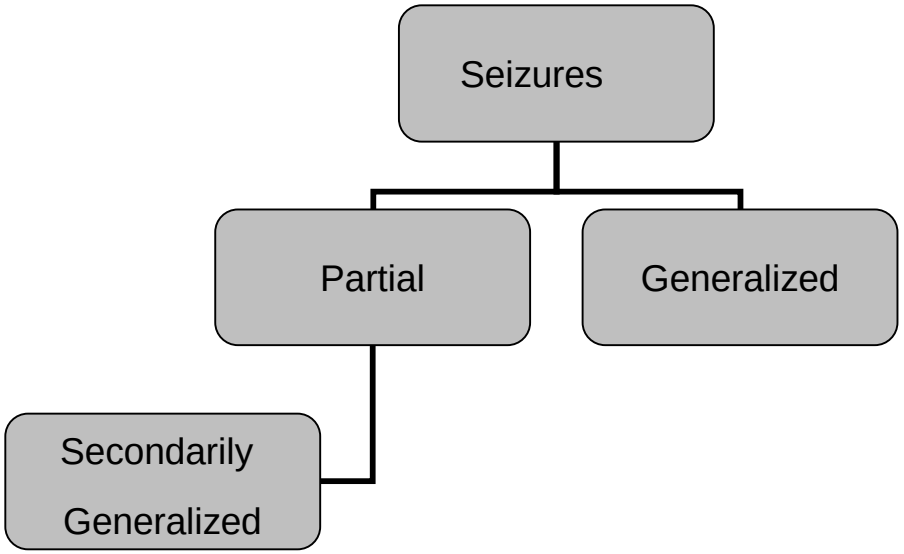
- Begins focally, with or without focal neurological symptoms
- Variable symmetry, intensity, and duration of tonic (stiffening) and clonic (jerking) phases
- Typical duration 1-3 minutes
- Postictal confusion, somnolence, with or without transient focal deficit



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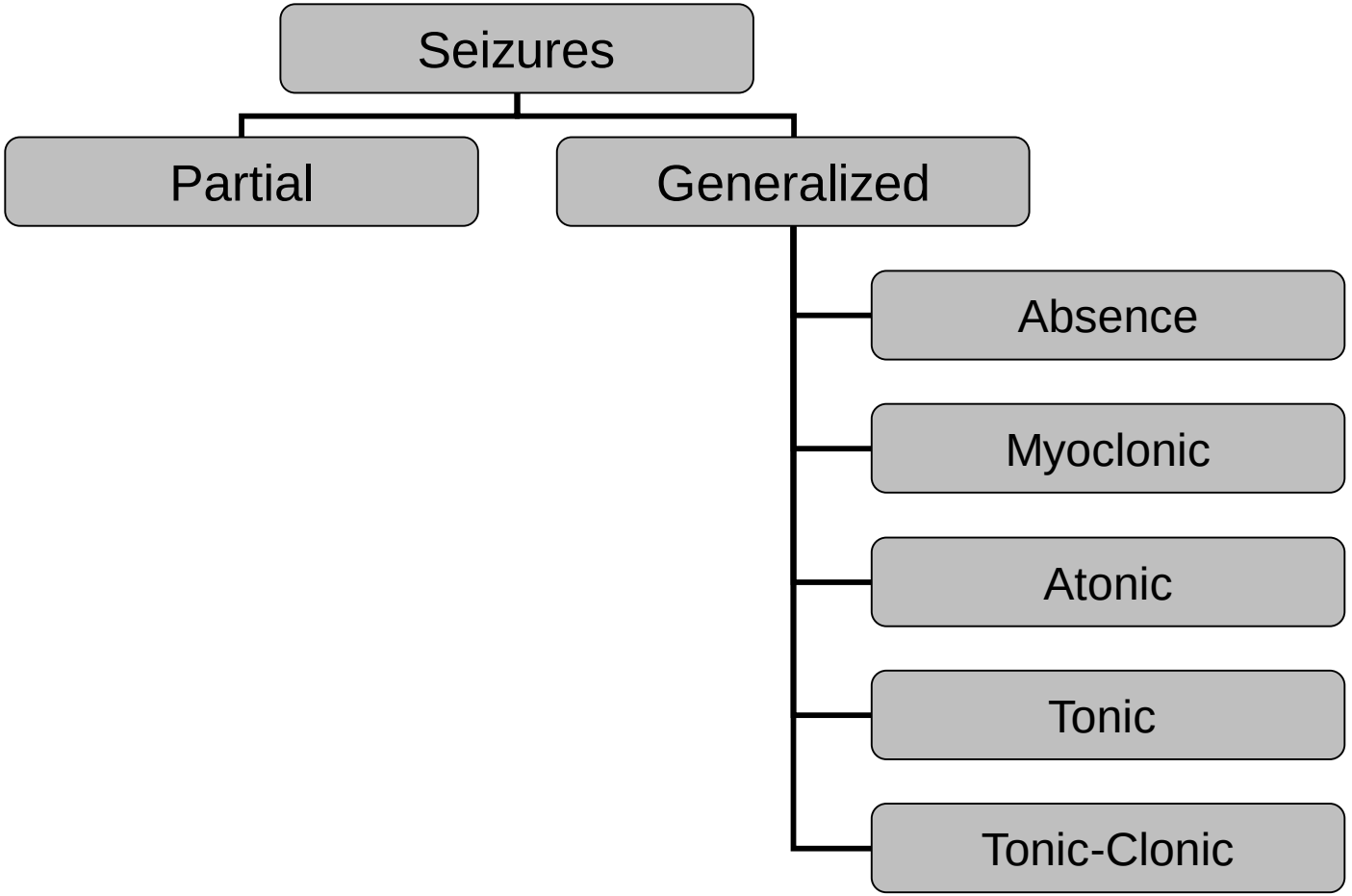
ILAE Classification of Seizures



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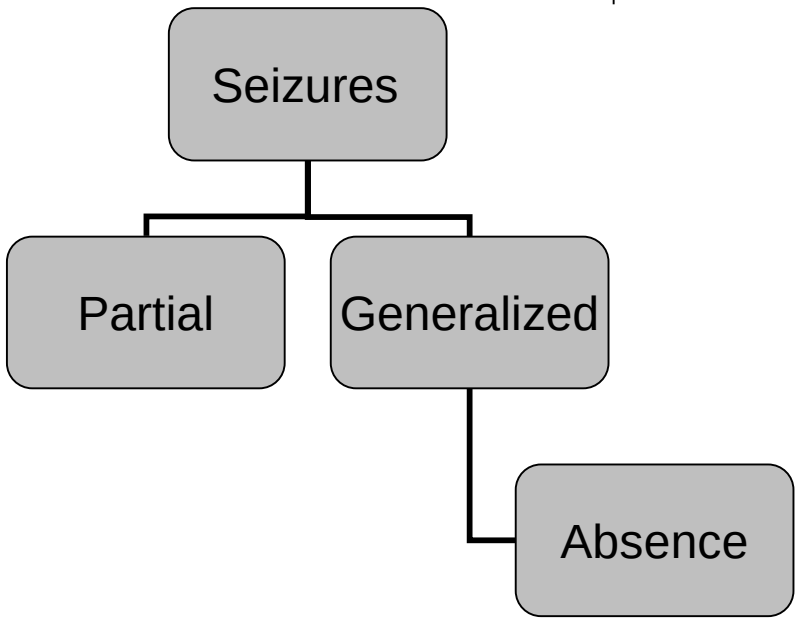
Typical Absence Seizures

- Brief staring spells ("petit mal") with impairment of awareness
  - 3-20 seconds
  - Sudden onset and sudden resolution
  - Often provoked by hyperventilation
  - Onset typically between 4 and 14 years of age
  - Often resolve by 18 years of age
- Normal development and intelligence
- EEG: Generalized 3 Hz spike-wave discharges



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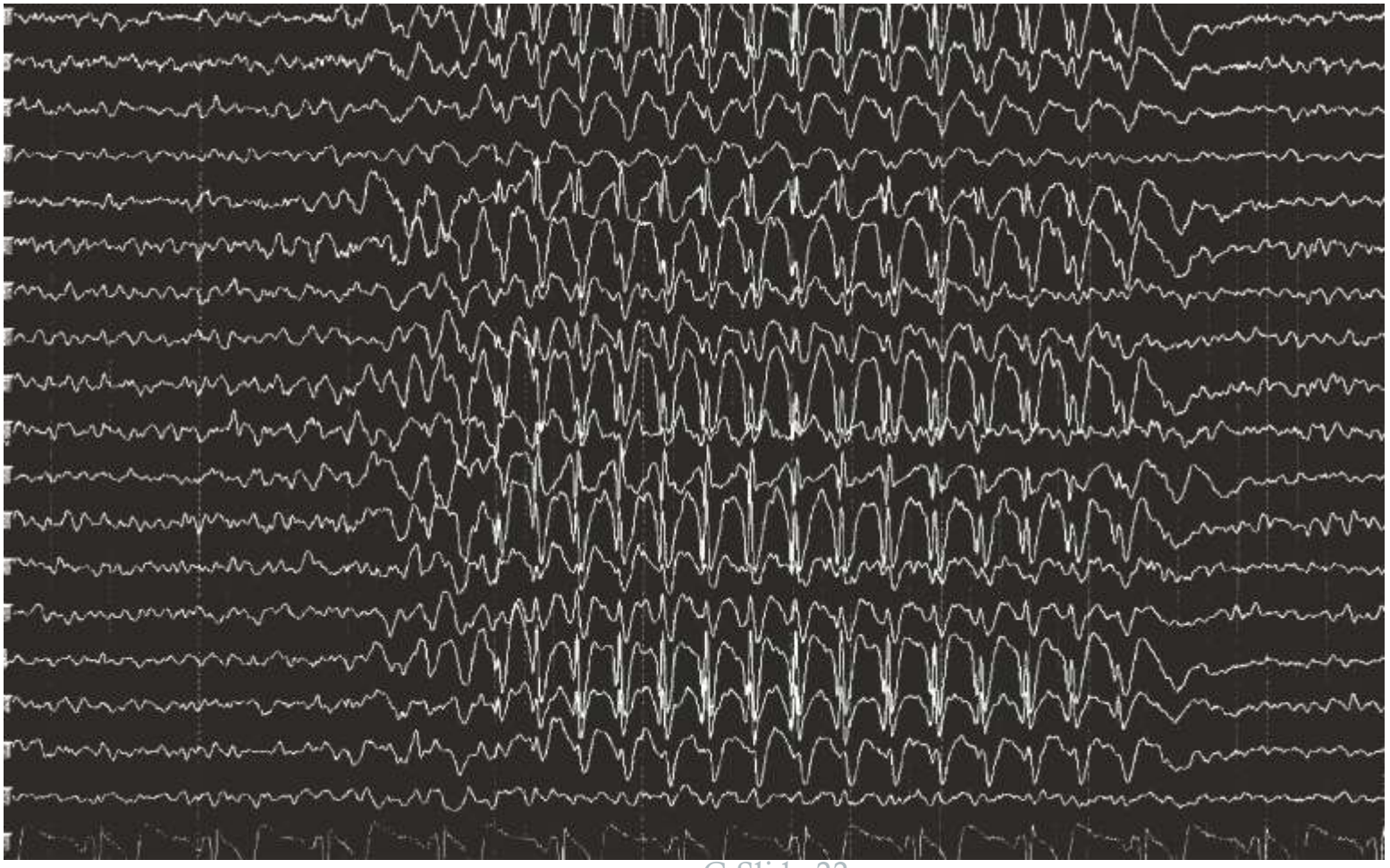
EEG: Typical Absence Seizure



American Epilepsy Society 2010

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Atypical Absence Seizures

- **Brief staring spells with variably reduced responsiveness**
  - **5-30 seconds**
  - **Gradual (seconds) onset and resolution**
  - **Generally not provoked by hyperventilation**
  - **Onset typically after 6 years of age**
- **Often in children with global cognitive impairment**
- **EEG: Generalized slow spike-wave complexes (<2.5 Hz)**
- **Patients often also have Atonic and Tonic seizures**

Atypical Absence Seizures

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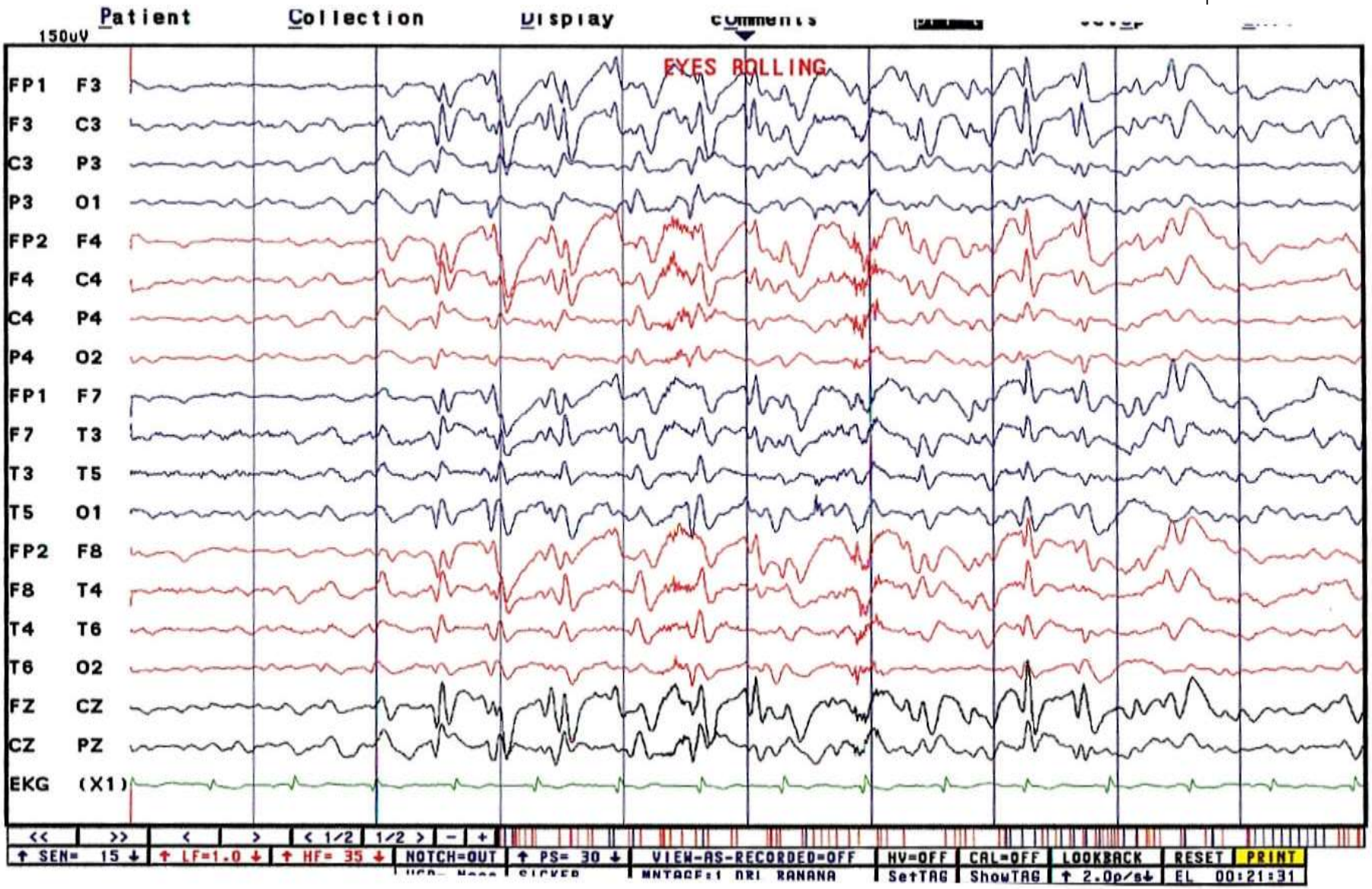

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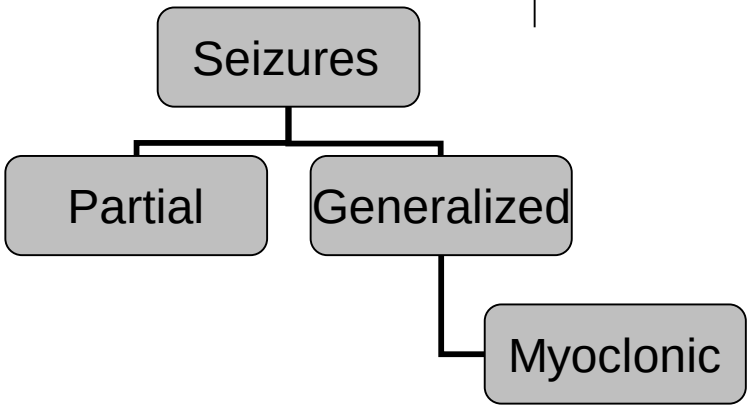
Myoclonic Seizures



Epileptic Myoclonus

- **Brief, shock-like jerk of a muscle or group of muscles**
- **Differentiate from benign, nonepileptic myoclonus (e.g., while falling asleep)**
- **EEG: Generalized 4-6 Hz polyspike-wave discharges**

Tonic and Atonic Seizures

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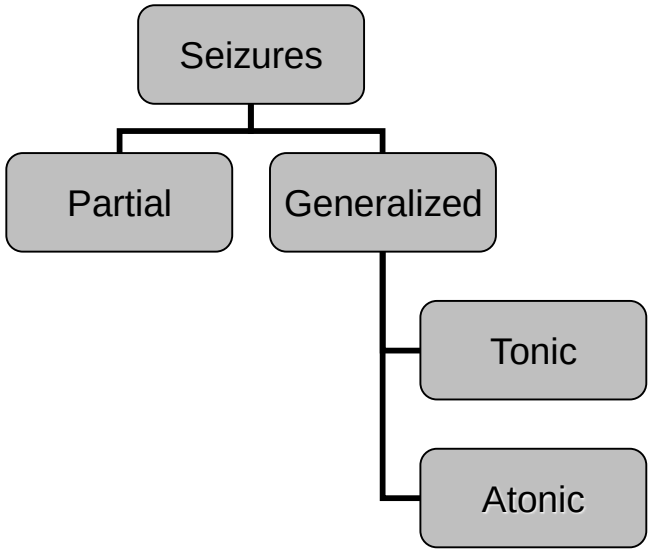
Tonic seizures

- Symmetric, tonic muscle contraction of extremities with tonic flexion of waist and neck
- Duration - 2-20 seconds.

Atonic seizures

- Sudden loss of postural tone
  - When severe often results in falls
  - When milder produces head nods or jaw drops.
- Consciousness usually impaired
- Duration - usually seconds, rarely more than 1 minute



Generalized Tonic-Clonic Seizures

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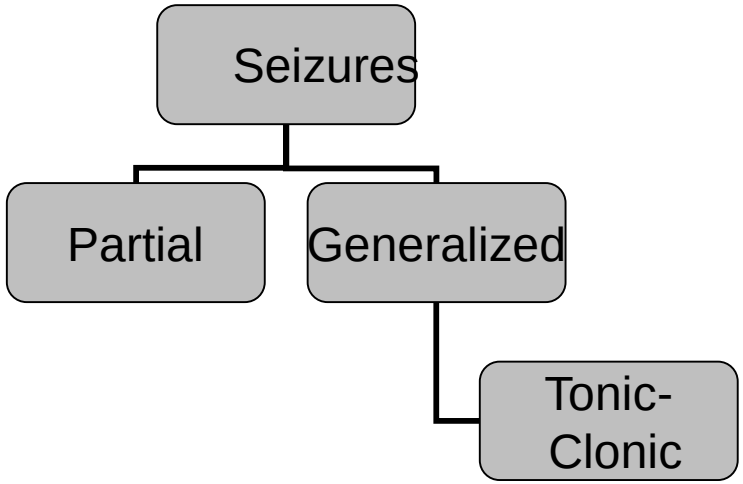
- Associated with loss of consciousness and post-ictal confusion/lethargy
- Duration 30-120 seconds
- Tonic phase
  - Stiffening and fall
  - Often associated with ictal cry
- Clonic Phase
  - Rhythmic extremity jerking
- EEG – generalized polyspikes



Differential diagnosis

1. Syncope.
2. Hysterical (pseudoseizure).
3. Others (sleep disorders, migraine, TIA, hypoglycemia)

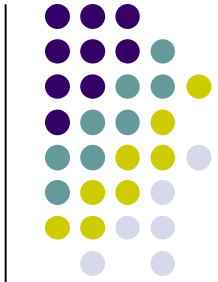
	Syncope	Seizures
Posture	Upright	Any posture
Pallor and sweating	Invariable	Uncommon
Onset	Gradual	Sudden/aura
Injury	Unusual	Not uncommon
Convulsive jerks	Not uncommon	Common
Incontinence	Rare	Common
Unconsciousness	Seconds	Minutes
Recovery	Rapid	Often slow
Post-ictal confusion	Rare	Common
Frequency	Infrequent	May be frequent

	Epileptic seizure	Pseudoseizure
Onset	Sudden	May be gradual
Retained consciousness	Very rare	Common
Cyanosis	Common	Unusual
Tongue biting and other injury	Common	Less common
Stereotyped attacks	Usual	Uncommon
Duration minutes	Seconds or minutes	Often many
Resistance to passive limb movement or eye opening	Unusual	Common
Prevention of hand falling on to face	Unusual	Common
Induced by suggestion	Rarely	Often
Post-ictal drowsiness or confusion	Usual	Often absent
Ictal EEG abnormality	Almost always	Almost never
Post-ictal EEG abnormality	Usually	Rarely

Investigations

- **EEG**
- **Brain imaging**
- **Lab.**

Strategy for epilepsy treatment



Whether to treat first seizure is controversial

- **16-62% of unprovoked seizures will recur within 5 years**
- **Relapse rate may be reduced by antiepileptic drugs**
- **Relapse rate increased if:**
  - **abnormal imaging**
  - **abnormal neurological exam**
  - **abnormal interictal EEG**
  - **family history**
- **Quality of life issues are important (ie driving)**

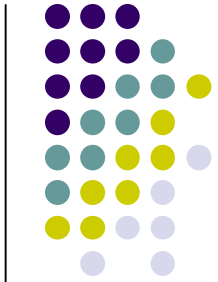
Two or more unprovoked fits within short interval → start

Strategy for epilepsy treatment

- ***General principles***

1. ***The diagnosis of seizures or epilepsy should be secure.***
2. ***An initiation or change in antiepileptic drug therapy needs a full and adequate discussion with the patient.***
3. ***The ultimate aim of treatment of epilepsy will be no seizures and no drugs.***

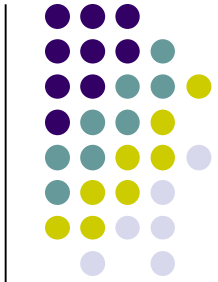
Strategy for epilepsy treatment



Starting therapy

- ***No prophylactic treatment.***
- ***When two or more unprovoked seizures have occurred within a short interval (6 months to 1 year), antiepileptic therapy is usually indicated.***
- ***Monotherapy is usually effective, less expensive, more compliant and no drug-drug interactions.***

Strategy for epilepsy treatment



Before starting treatment

- **Baseline haematological and biochemical investigations.**
- **Gradual titration of dose till seizure control without adverse effects.**
- **If monotherapy failed ??????????**
- **If failed ???????**
- **Add-on therapy.**

Strategy for epilepsy treatment

- ***The choice of drug***

Partial seizures	*Generalized seizures*
First line: ▪ **Lamotrigine** ▪ **Carbamazepine** ▪ **Oxacarbazepine** ▪ **levitracetam**	*First line:* ▪ **Sodium Valproate**
Second line (adjunctive to first line) ▪ *Phenytoin* ▪ *Gabapentin* ▪ *Vigabatrine* ▪ *Tiagabine*	*Second line (adjunctive to first line)* ▪ **Lamotrigine** ▪ *Topiramate* ▪ *Levitracetam* ▪ *Phenobarbital* ▪ *BENZ*

Status epilepticus

Definition:

SE is defined as continuous or repetitive seizure activity persisting for at least 30 minutes without recovery of consciousness in between attacks.

Classification:

- **Convulsive status epilepticus .**
- **Nonconvulsive status epilepticus (NCSE)**
  - ✓ Absence status
  - ✓ Complex partial status epilepticus

Aetiology:

- the most common cause is change in medication or non compliance or abrupt withdrawal of AEDs .
- CVS
- Drug/alcohol induced
- Infection
- Tumors
- Head trauma
- Metabolic disturbances

Complications of SE

A) Neurological

- Excitotoxicity
- Increased neuronal metabolic demand
- Mass effect
- Changes in blood flow

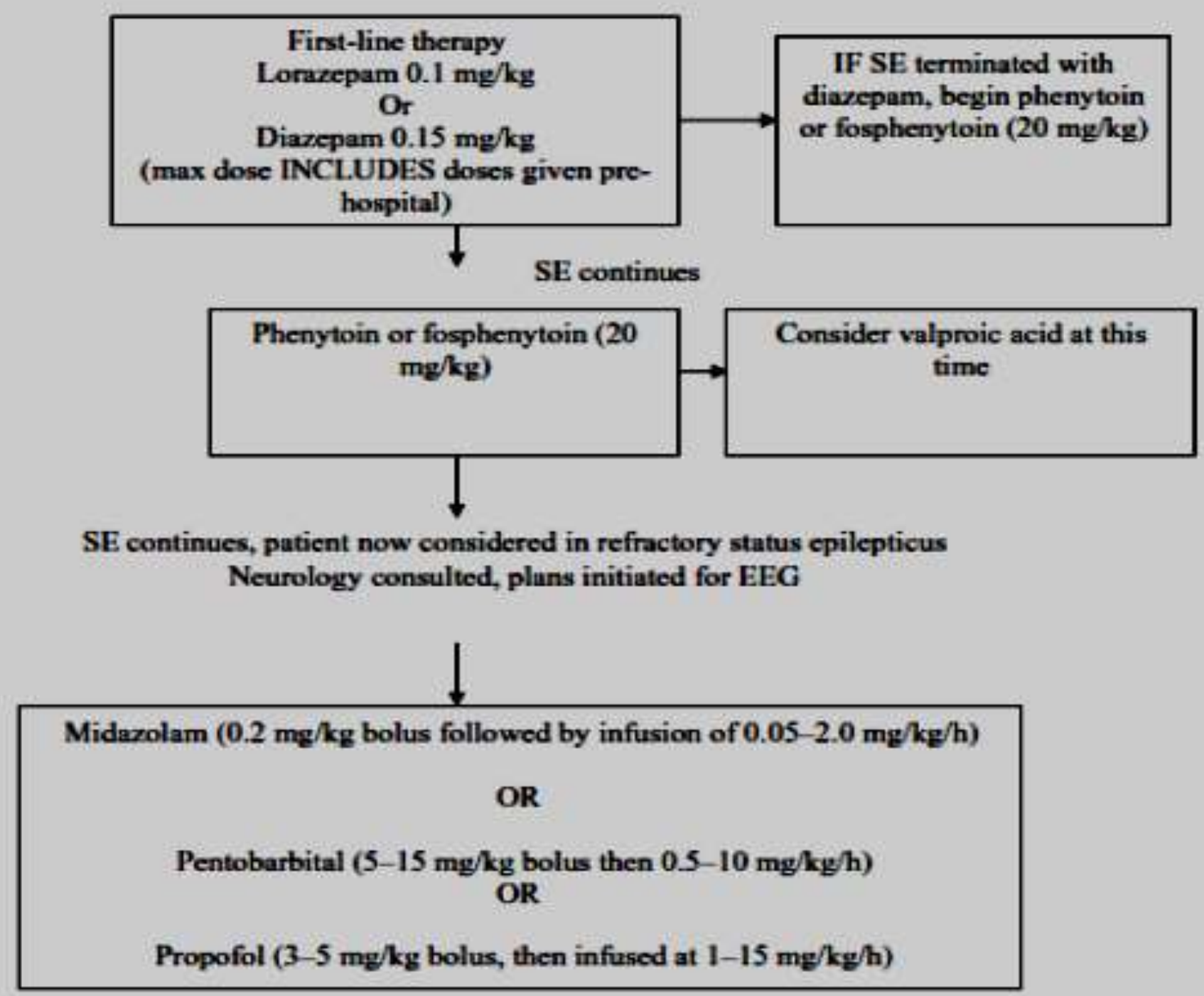
B) Systemic disturbances:

- Pulmonary edema
- High output cardiac failure
- Cardiac arrhythmias
- Aspiration pneumonia
- Fever
- Hypoxia
- Electrolyte imbalance
- Acute tubular necrosis
- Rhabdomyolosis

Management of SE

General measures

- **Lateral positioning to prevent aspiration.**
- **Airway protection and O_2 administration.**
- **ECG monitoring.**
- **IV access with 3 blood samples** (ABG, AED, toxicology screening).
- **Thiamine administration** 100 mg IV **for malnourished and alcoholic patients.**
- **50 ml dextrose 50% unless hypoglycemia excluded.**
- **Pyridoxine for neonates and patients taking isoniazid.**
- **Intravenous fluids if hypotension.**


First-line therapy
Lorazepam 0.1 mg/kg
Or
Diazepam 0.15 mg/kg
(max dose INCLUDES doses given pre-hospital)
IF SE terminated with diazepam, begin phenytoin or fosphenytoin (20 mg/kg)
SE continues
Phenytoin or fosphenytoin (20 mg/kg)
Consider valproic acid at this time
SE continues, patient now considered in refractory status epilepticus
Neurology consulted, plans initiated for EEG
Midazolam (0.2 mg/kg bolus followed by infusion of 0.05–2.0 mg/kg/h)
OR
Pentobarbital (5–15 mg/kg bolus then 0.5–10 mg/kg/h)
OR
Propofol (3–5 mg/kg bolus, then infused at 1–15 mg/kg/h)


THANK YOU
اللهم
اجعلنا من الذين إذا
أحسنوا استبشروا .
وإذا أساءوا استغفروا