Epilepsy

- Epilepsy, a group of disorders characterized by *recurrent* seizures,
- seizure is a transient disturbance of cerebral function caused by an excessive or over-synchronized discharges of cerebral neurons.

- Epilepsy is a common cause of episodic loss of consciousness;
- incidence of epilepsy in the general population is 45/100,000;
- prevalence of epilepsy is 0.5%
- the life-time probability of a seizure is approximately 3%.

Etiology of seizures:

- Seizures can result from either primary central nervous system dysfunction or an underlying metabolic derangement or systemic disease.
- This distinction is critical, since therapy must be directed at the underlying disorder as well as at seizure control.

Primary neurologic disorders:

- Benign febrile convulsions of childhood
- Idiopathic epilepsy
- Head trauma
- Stroke or vascular malformations
- Mass lesions
- Meningitis or encephalitis
- HIV encephalopathy

Systemic disorders:

- hypoglycemia, hyponatremia, hyperosmolar states
- hypocalcemia
- uremia, hepatic encephalopathy
- porphyria
- drug overdose (including diazipam), drug withdrawal
- global cerebral ischemia
- hypertensive encephalopathy, eclampsia
- hyperthermia

Drugs Reported to Cause Seizures:

- Anticholinesterases (organophosphates, physostigmine)
- Antidepressants (tricyclic, monocyclic, heterocyclic)
- Antihistamines
- Antipsychotics (phenothiazines, butyrophenones, clozapine)
- Adrenergic receptor blockers (propranolol, oxprenolol)
- Chemotherapeutics (etoposide, ifosfamide, cisplatinum)
- Cyclosporine, FK 506
- Hypoglycemic agents (including insulin)
- Hypoosmolar parenteral solutions

- Isoniazid
- Local anesthetics (bupivacaine, lidocaine, procaine, etidocaine)
- Methylxanthines (theophylline, aminophylline)
- Narcotic analgesics (fentanyl, meperidine, pentazocine, propoxyphene)
- Penicillins
- Phencyclidine
- Sympathomimetics (amphetamines, cocaine, ephedrine, Methylenedioxymethamphetamine "ecstasy," phenylpropanolamine, terbutaline)

Trigger factors for seizures:

- Sleep deprivation
- Alcohol (particularly withdrawal)
- Recreational drug misuse
- Physical and mental exhaustion
- Flickering lights, including TV and computer screens
- Intercurrent infections and metabolic disturbances
- Fasting (via hypoglycemia)
- Uncommonly: loud noises, music, reading, hot baths (reflexive epilepsy)

Classical classifications of epilepsy according to seizure type

- Primary generalized, epileptic activity starting in large areas (at least 75%) of both cerebral hemispheres simultaneously

tonic-clonic (grand mal)
tonic, only tonic phase
clonic, only clonic phase
atonic
myoclonic
absence (patit mal)

- Focal:

Simple focal, effecting single specific area & no conscious impairment: motor, sensory, autonomic, versive
Multifocal, effecting more than one specific area & no conscious impairment
Complex partial (psycho-motor), effect areas (large in size) in cortex related to consciousness: temporal lobe epilepsy, frontal lobe epilepsy

- Focal with 2nder generalization, start focally then spreed globally within brain to become tonic-clonic. The focal onset reflected clinically by "aura" phase.

Classification of epilepsy according to type of cause

- Idiopathic: where focal brain lesion not the cause. Brain images in this type must be normal
- Secondary epilepsy: where the cause is focal brain lesion detectable by brain images
- Cryptogenic epilepsy: when focal brain lesion is still suspected as a cause, inspite the fact that brain images are normal

GENERALIZED TONIC-CLONIC (GRAND MAL) EPILEPSY

- consciousness is lost
- usually patient do not give history of aura, even if it was really happened due to focal start of epileptic activity because of retrograde amnesia
- Attack composed from following phases:
- *Tonic Phase*

The initial manifestations are unconsciousness and tonic contractions of limb muscles for 10–30 seconds, producing extension of the extremities and arching of the body in apparent opisthotonos. Tonic contraction of the muscles of respiration may produce an expiration-induced vocalization (cry or moan) and cyanosis, and contraction of masticatory muscles may cause tongue trauma. The patient falls to the ground and may be injured.

- *Clonic Phase*

The tonic phase is followed by a clonic (alternating muscle contraction and relaxation) phase of symmetric limb jerking that persists for an additional 30–60 seconds—or longer. Ventilatory efforts return immediately after cessation of the tonic phase, and cyanosis clears. The mouth may froth with saliva. With time, the jerking becomes less frequent, until finally all movements cease and the muscles are flaccid. Sphincteric relaxation or detrusor muscle contraction may produce urinary incontinence.

- *Recovery*

As the patient regains consciousness, there is postictal confusion and often headache & feeling of pain in bones & muscles. Full orientation commonly takes 10–30 minutes or even longer in patients with status epilepticus (see below) or preexisting structural or metabolic brain disorders. Physical examination during the postictal state is usually otherwise normal in idiopathic epilepsy or seizures of metabolic origin, except that *both* plantar responses may be transiently extensor (Babinski sign) & corenial reflex may be lost.Transient unilateral weakness (hemiparesis) in the postictal period ***(Todd paralysis)*** should be sought, because such a finding suggests a focal brain lesion as the cause and calls for further investigation.

Status Epilepticus (S.E)

- seizures that continue for 30 minutes (operational dimension 2 time "t_2") or more without ceasing spontaneously,
- or which recur so frequently that full consciousness is not restored between successive episodes.
- Major (convulsive) S.E is a medical emergency because it can lead to permanent brain damage—from hyperpyrexia, circulatory collapse, or excitotoxic neuronal damage—if untreated

Predisposing factors for status epilepticus

- *Sudden withdrawal of antiepileptic drugs* (most common)
- Non compliance
- Metabolic disturbances
- Drug toxicity
- C.N.S infection
- C.N.S tumors
- Refractory epilepsy
- Head trauma

ABSENCE (PETIT MAL) EPILEPSY

- genetically transmitted
- that always begin in childhood
- rarely persist into adolescence
- characterized by brief loss of consciousness (for 5–10 seconds) without loss of postural tone
- Subtle motor manifestations, such as eye blinking or a slight head turning, are common
- Automatisms are uncommon
- Full orientation immediately follows cessation of the seizure (no postictal confusion)

- There may be as many as several hundred spells daily, leading to impaired school performance and social interactions, so that children may be mistakenly thought to be mentally retarded before the diagnosis of petit mal epilepsy is made
- The spells are characteristically inducible by hyperventilation

Myoclonic Seizures

- characterized by sudden, brief, shock like contractions that may be localized to a few muscles or one or more extremities or that may have a more generalized distribution
- may be idiopathic (juvenile myoclonic epilepsy), which start in early adolescent
- or associated with a variety of rare hereditary neurodegenerative disorders, including Unverricht-Lundborg disease, Lafora body disease, neuronal ceroid lipofuscinosis (late infantile, juvenile, and adult forms), sialidosis, and mitochondrial encephalomyopathy (myoclonus epilepsy with ragged red fibers on skeletal muscle biopsy)

Atonic seizures

- Brief loss of postural tone with loss of consciousness for 1-2 seconds
- leading to a fall or drop attack
- sometimes following a myoclonic jerk

Simple partial seizures

- begin with motor, sensory, or autonomic phenomena, depending on the cortical region affected
- Just *few* examples:

Simple motor focal: epileptic focus located in pre-central gyrus. Clonic movements of a single muscle group in the face, a limb, or the pharynx may occur and may be self-limited; they may be recurrent or continuous (epilepsia partialis continua) or may spread to involve contiguous regions of the motor cortex (motor jacksonian march) which completed over 30 seconds.

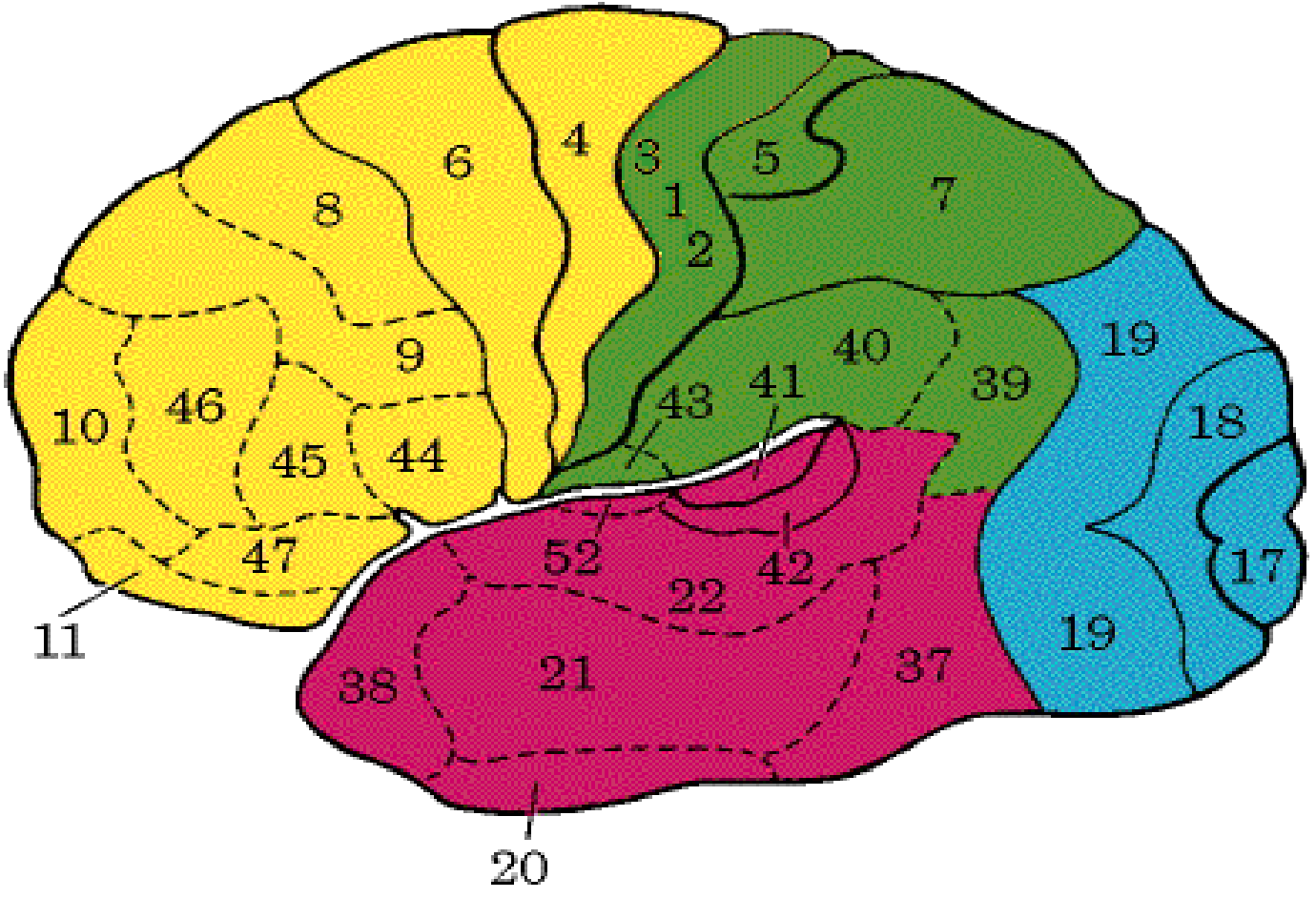
Simple somato-sensory focal: when epileptic focus located in primary somatic sensory cortex in post-central gyrus (broadman's cortical areas 3,1 &2). Fit n forms of numbness or parasthesia over a part of body, like face or hand. There may be a spreed (sensory jacksonian march) corresponding to that of simple motor focal seizure

Simple autonomic focal: may consist of pallor, flushing, sweating, piloerection, pupillary dilatation, vomiting, borborygmi, and incontinence

Simple psychic focal: psychic symptoms include dysphasia, distortions of memory (eg, déjà vu, the sensation that a new experience is being repeated), forced thinking or labored thought processes, cognitive deficits, affective disturbances (eg, fear, depression, an inappropriate sense of pleasure), hallucinations, or illusions

- If epileptic focus in parietal lobe area responsible for balance, fit will be in form of vertigo
- If it is located in occipital lobe, fit will be in form of simple visual hallucinations like simple lines, flashes …
- If it is located in temporal lobe, fit could be in form of complex visual hallucinations like human faces, &/or deja vue, james vue, auditory hallucinations ….
- If it is in pyriform & prepyriform cortex, fit will be in form of olfactory hallucinations
- If it is in para-hippocampal gyrus, fit will be in form of gustatory hallucinations

- Versive seizure refer to tonic conjugate eyes deviation to contra-lateral side due to focal seizure activity in frontal eye field area (area 8A). Secondary generalization is common.
- Most common site for focal epilepsy is parietal lobe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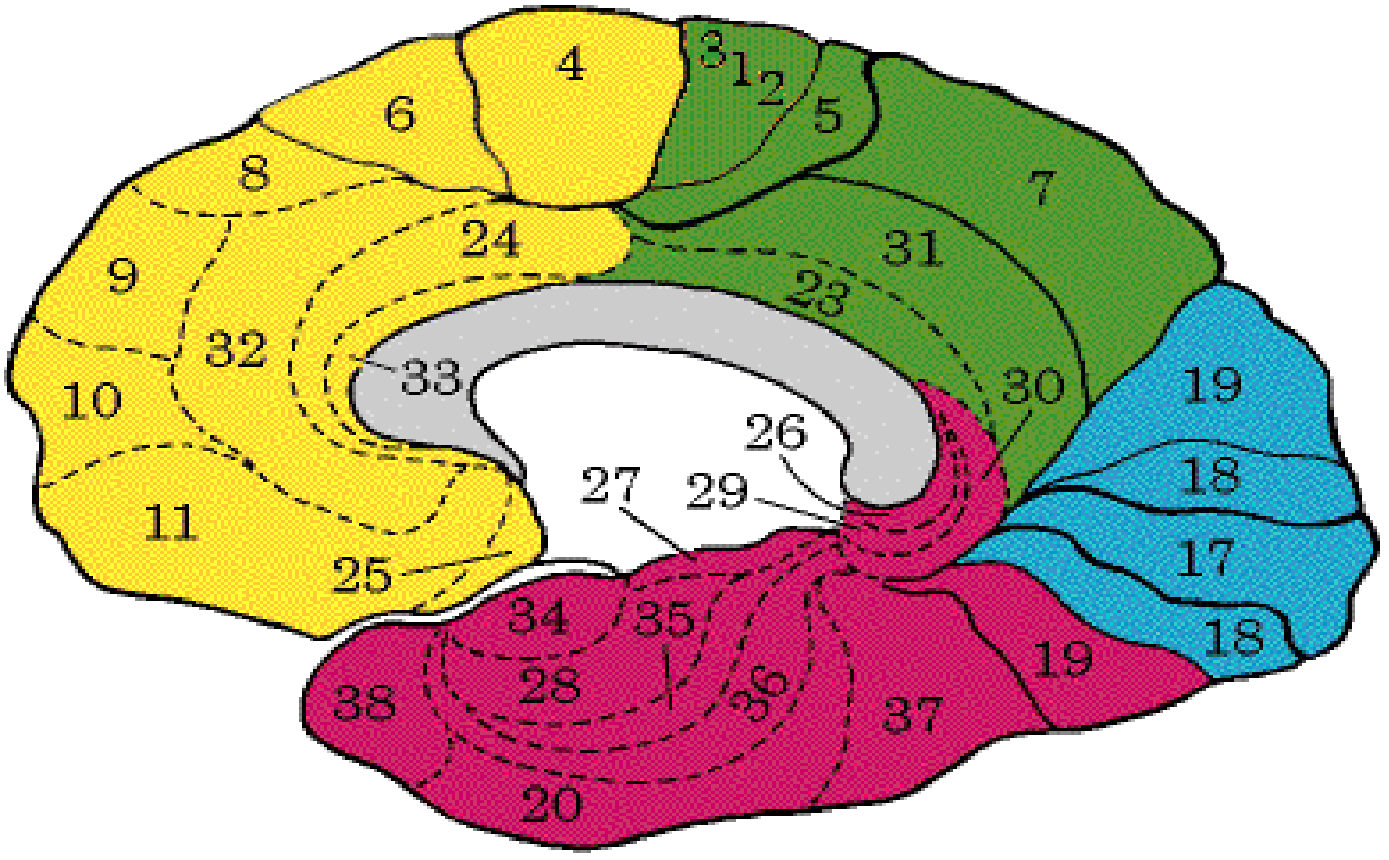
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TEMPORAL LOBE EPILEPSY (TLE)

- The symptoms are usually stereotyped for the individual patient
- Episodes may begin with an aura
- Epigastric sensations are most common, but
- affective (fear), cognitive (déjà vu), and sensory (olfactory hallucinations) symptoms also occur.
- Consciousness is then impaired
- Seizures generally persist for less than 30 minutes (on the average, 1–3 minutes)
- Patient show unusual interests in philosophy & religion

- The motor manifestations of complex partial seizures are characterized by coordinated involuntary motor activity, termed automatism, which takes the form of orobuccolingual movements in about 75% of patients and other facial or neck movements in about 50%. Sitting up or standing, fumbling with objects, and bilateral limb movements are less common. Secondary generalization may occur

FRONTAL LOBE EPILEPSY

- Less common than TLE, & more difficult to diagnosis
- It can be confused with psychosis
- It must be considered in any case of atypical psychosis
- Characterized by pelvic twisted movement that happen during sleep, which may lead patient to fail from the bed
- Patient look like a confused person that heir/his mind not with us
- Need nocturnal (sleep) video monitoring EEG for diagnosis