Epilepsy

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Epilepsy

Epileptic seizures: an abnormal and excessive discharge of brain neurons involving hypersynchrony accompanied by some behavioral change.
Definition of epilepsy

- Epilepsy: – two or more seizures
  - occur in attacks
  - the behavioural changes are usually stereotyped
  - epileptiform abnormalities on EEG
- Acute and recurrent seizures, status epilepticus, occasional convolution
- Epilepsy syndrome as a clinical entity
Epidemiology of epilepsy

1. *The prevalence* within a particular population: 0.3-0.6-1.0%. In children: >1%
2. Man/woman: 1.1-1.7
3. *The incidence*: 0.4-0.7-1.0‰ /year
4. *The chances* of having at least one seizure during a lifetime: 8-10%
Classification of epileptic seizures

1. Partial (focal, local) seizures

1.1. Simple partial seizures

• with motor signs
• with somatosensory or special sensory symptoms
• with autonomic symptoms
• with psychic symptoms
Classification of epileptic seizures

1.2. *Complex partial seizures*

- Simple partial onset followed by impairment of consciousness
  - only with impairment of consciousness
  - with automatism
- With impairment of consciousness at onset
1.3. Partial seizures evolving to secondary generalized seizures

• Simple partial seizures →
• Complex partial seizures →
• Simple partial seizures → Complex partial seizures →
Classification of epileptic seizures

2. Generalized seizures
   Absence seizures (typical and atypical)
   Myoclonic seizures
   Clonic seizures
   Tonic seizures
   Tonic-clonic seizures
   Atonic (astatic) seizures

3. Unclassified epileptic seizures
Situation-related seizures

- Febrile convulsions
- Seizures occurring only with an acute or toxic event, due to factors such as alcohol, drugs, eclampsia, nonketotic hyperglycaemia
Developmental cortical malformations with epilepsy

• Pachygyria, heterotopia (nodular), lissencephaly
• Polymicrogyria, shizencephaly, cortical dysplasia (gliosis), microdysgenesis
Developmental cortical malformations with epilepsy

2. *Malformations due to abnormal neuronal and glial proliferation:* microencephaly, non-neoplastic (tuberous sclerosis), neoplastic (ganglioglioma)

3. *Neurocutaneous disorders:* Sturge-Weber syndrome, neurofibromatosis

4. *Others:* subarachnoid cyst, porencephaly
Etiologies of epilepsy

**genetic factors**

- The concordance rate in monozygotic twins: >70%, in dizygotic twins: 15%

- *Occurrence of epilepsy in relatives*
  - In idiopathic epilepsy: 1.3 - 8%
  - In symptomatic epilepsy: 0.5 - 5%
  - In normal population: 0.5%
Diagnosis of epilepsy

- Seizures are diagnosed primary by the history (anamnesis, heteroanamnesis)
- Laboratory tests, ECG (Holter), Doppler examination of supraaortic arteries, examination of CSF, toxicology
Diagnosis of epilepsy

**EEG:** routine, sleep deprivation, photic stimulation, HV, digital analysis of power spectrum, sphenoidal recording, Holter EEG, split screen EEG (video+EEG)
Diagnosis of epilepsy

- Neuroimaging
  - MRI, (CT scan), SPECT, PET
- Genetic examination
- Psychological, psychiatric examination
Nonepileptic paroxysmal disorders

- Cardiovascular
  - Syncope
  - Breath-holding spells (cyanotic, noncyanotic)
  - Mitral valve prolapse

- Cerebrovascular (transient ischemic attack)

- Migraine
Nonepileptic paroxysmal disorders

- Movement disorder
  - Tics, Tourette’s syndrome
  - Myoclonus
  - Chorea and paroxysmal choreoathetosis
Nonepileptic paroxysmal disorders

- Sleep disorders
  - Narcolepsy
  - Sleep terrors and somnambulism
  - Rapid eye movement (REM) sleep disorder
  - Benign sleep jerks
  - Periodic leg movements (nocturnal myoclonus)
Nonepileptic paroxysmal disorders

- Metabolic-toxic (e.g., pheochromocytoma, drug ingestion)
- Gastrointestinal
- Psychiatric
  - Psychogenic seizures
  - Somatization and dissociative disorders
  - Panic disorder
  - Intermittent explosive disorder
  - Malingering
Surgical treatment of epilepsy

Ten percent to 15% of patients with refractory seizures may be surgical candidates. The aim of surgery is to remove the focus of origin of the seizures or to prevent spread of the seizure discharge.
Presurgical evaluation

- Patient selection
- Clinical evaluation
- EEG (interictal recordings, ictal recordings to document seizure onset, EEG/video telemetry monitoring is required, intracranial EEG recording: epidural electrodes subdural strip electrodes, IC electrodes)
- Neuroimaging (MRI, SPECT, PET, functional MRI)
- Neuropsychological Psychiatric Assessment
Surgical procedures

- Lesionectomy (dysplasia, ganglioma, low grade gliomas, vascular anomalies, neuronal migration, in presence of mesial-temporal sclerosis)

- Selective amygdalohippocampectomy (focal mesio-temporal sclerosis)
Surgical procedures

- Anterior temporal lobectomy (amygdala, anterior hippocampus, anterior temporal neocortex)
- Hemispherectomy (Sturge-Weber syndrome, Lennox-Gastaut Syndrome)
- Corpus callosotomy (anterior two-thirds or complete; atonic seizures, Lennox-Gastaut syndrome)
- Multiple subpial transection