Epilepsy

Medicine Team

Note

Imp

Sources: Slides – Recording – 427 – Step up to medicine

Epilepsy

Definition:

A chronic neurologic disorder manifesting by repeated epileptic seizures (attacks or fits) which result from paroxysmal uncontrolled discharges of neurons within the central nervous system (grey matter disease "imp")

An epileptic seizure is an abnormal and excessive focal or generalized discharge of neurons usually accompanied by an observable behavioral abnormality. It is a symptom of the brain hyper-excitability which may affect otherwise normal individuals (e.g. with ECT, head trauma).

Epilepsy is a predisposition to recurrent epileptic seizure, with various etiologies.

The clinical manifestations range from a major motor convulsion to a brief period of lack of awareness. The stereotyped and uncontrollable nature of the attacks is characteristic of epilepsy.

Pathogenesis

- The 19th century neurologist Hughlings Jackson suggested "a sudden excessive disorderly discharge of cerebral neurons" as the causation of epileptic seizures.
- Recent studies in animal models of focal epilepsy suggest a central role for the excitatory neurotransmiter glutamate (increased in epi) and inhibitory gamma amino butyric acid (GABA) (decreased)

Causes: (4 Ms & 4Is)

1- Metabolic & electrolyte disturbance – hyponatremia, hypoglycemia, hyperglycemia, uremia, hyperthermia.
2- Mass lesion – brain metastases, 1ry brain tumors, hemorrhage.
3- Miss drugs – Non-compliance with anticonvulsants in patients with epilepsy, Acute withdrawal from alcohol, benzodiazepines, barbiturate.
4- Miscellaneous – pseudoseizure, Eclampsia, hypertensive encephalopathy)
5- Intoxications – cocaine, lithium, lidocaine, metal poisoning, CO poisoning.
6- Infection – septic shock, bacterial or viral meningitis, brain abscess.
7- Ischemia – stroke, Transient ischemic attack (common cause of seizure in elderly patients)
8- Increased ICP.

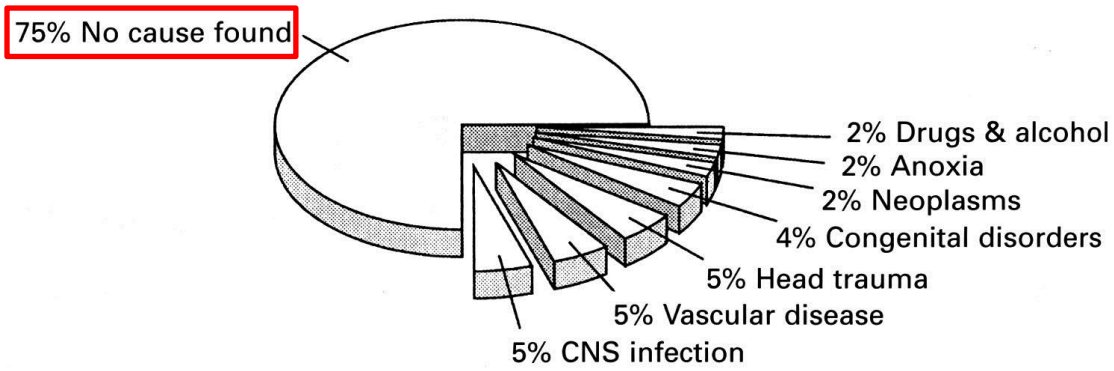
Epidemiology and course

- Epilepsy usually presents in **childhood or adolescence** but may occur for the first time at any age.
- 5% of the population suffer a single seizurez at some time.
- 0.5-1% of the population have recurrent seizure = EPILEPSY
- 70% well controlled with drugs (prolonged remissions); 30% epilepsy at least partially resistant to drug treatments = **INTRACTABLE EPILEPSY.**

Epilepsy:

- Epilepsy is a predisposition to recurrent epileptic seizure, with various etiologies.

Epilepsy is a symptom of numerous disorders, but in the majority of sufferers the cause remains unclear despite careful history taking,examination and investigation.



Epilepsy – Classification

- The modern classification of the epilepsies is based upon the nature of the seizures rather than the presence or absence of an underlying cause.
- Seizures which begin **focally** from a single location within one hemisphere are thus distinguished from those of a **generalised** nature which probably commence in a deeper structures and project to both hemispheres simultaneously.

1- Partial (focal) seizures (with or without secondary generalization) :

A- Simple Partial :

(Motor, Sensory, Autonomic, Psychic)

B- Complex Partial (with or without automatisms):

- Impairment of consciousness at onset.
- Simple partial onset followed by impairment of consciousness

2- Genleraized seizures (convulsive or non-convulsive):

A- Tonic-clonic (Grand Mal).

B- Absence (typical Petit Mal or atypical).

D- Myoclonic.

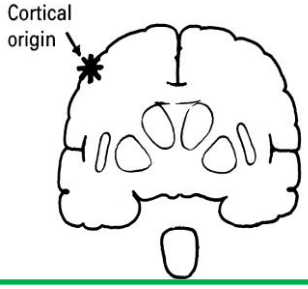
D- Clonic.

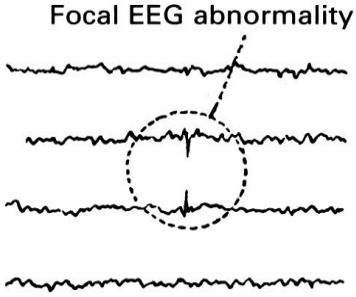
E- Atonic.

1- Partial (focal) seizures: (account for 80% of adult epilepsies)

A- Simple partial seizures:

- Motor, sensory, vegetative or psychic symptomatology.
- Typically consciousness is preserved.

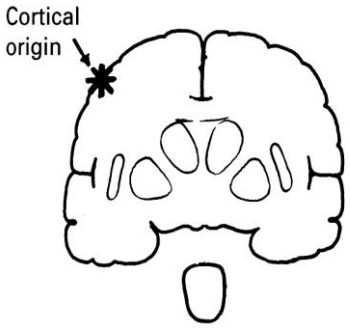


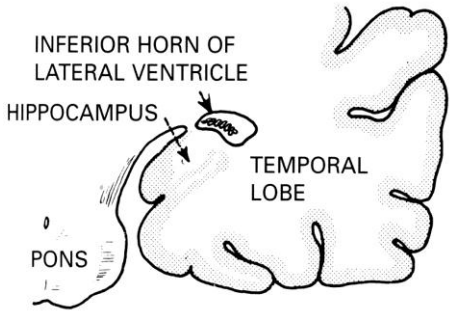


- It's a seizure in which the first clinical and EEG changes indicates initial activation of a system of neurons limited to part of one cerebral hemisphere but where there is no alteration of consciousness.
- Clinical symptoms, is determined by the anatomical location of the seizure focus. May be: motor signs, sensory symptoms, autonomic signs and symptoms, psychic symptoms.
- The seizure remains localized but may evolove into a complex partial seizure.
- May involove transient unilateral clonic-tonic movement.

B- Complex partial seizure (psychomotor seizure) :

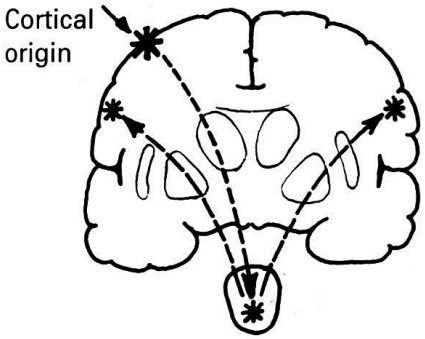
- Initial subjective feeling (aura), Impaired level of consciousness, abnormal (automatic) behavior (perioral and hand automatisms)
- Typically originates in the temporal lobe

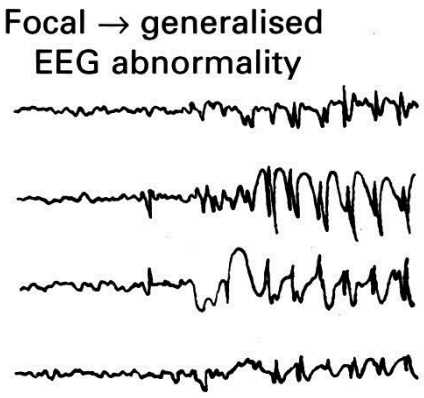




- May evolve from simple partial seizure and to a secondarily generalized tonic-clonic seizure.
- Occur in 40% of patients with epilepsy.
- Most common seizure type seen in adult.
- 50% of patients have onset in childhood.
- Drugs control seizure in less than ½ of patients.
- Disabling psychosocial disturbances develop in 1/3.

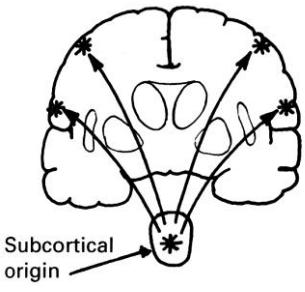
Both type of partial seizure may evolve to tonic/clonic convulsion (secondary generalised tonic/clonic seizures "sGTCS")

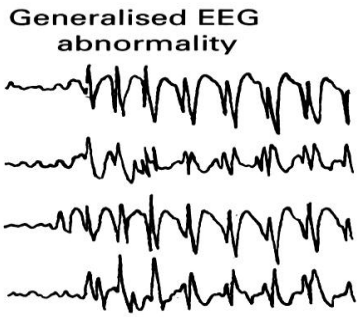




Finally, In case of partial seizures ALWAYS do MRI to detect the cause because it is usually associated with tumor or brain lesion.

2- Genleraized seizures (convulsive or non-convulsive):





A- Absences seizure (Petit Mal):

- Sudden onset brief (lasting a few second) but may be quite frequent (up to 100 times per day)
- May have stereotyped motor automatisms (mild clonic or tonic), especially if prolonged.
- No post-ictal confusion or other symptoms.
- Typically involves school-age children - usually resolves as child grows older.
- Patient seems to disengage from current activity and "stare into space' the return to the activity several seconds later; patient looks "absent minded" and usually unresponsive when spoken to.

B- Tonic-clonic seizures (Grand Mal):

- Bilaterally symmetric and without focal onset
- Begin with sudden fall of consciousness – a fall to the ground.
- Tonic phase – the patient become rigid; trunk and limp extension occurs. And the patient may become apneic in this phase.
- Clonic phase – this's the musculature jerking of the limbs and the body for at least 30 second.
- The patient then become flaccid and comatose before regaining consciousness.
- Other features may include tongue biting, vomiting, apnea, and incontinence (urine and/or feces)

C- Myoclonic seizures:

- Sudden very brief shock-like muscular contractions.
- May be generalized or confined to the face and trunk, to one or more extremities, or to individual muscles or group of muscles.
- May be regularly repetitive or sporadic.
- May occur in other neurological conditions as well as epilepsy.

D- Atonic seizures:

- Sudden diminution in muscles tone, which may be fragmentary.
- Extremely brief or no loss of consciousness.
- May occur repetitively in a rhythmic, successive manner.
- Atonic seizure frequently seen in Lennox-Gastaut Syndrome; drop attacks may occur in neurological condition other than epilepsy.

Investigation:

The concern of the clinician is that epilepsy may be symptomatic of a treatable cerebral lesion.

- **Routine investigation:** Haematology, biochemistry (electrolytes, urea and calcium, blood glucose), chest X-ray, electroencephalogram (EEG), CBC, LFTs, renal function test and urinanalysis.

  Neuroimaging (CT/MRI) should be performed in all persons aged 25 or more presenting with first seizure and in those pts. with focal epilepsy irrespective of age.
  MRI more sensitive than a CT scan in identifiyng strucural changes, but not always practicle (e.g., in an unstable patient)
- **Specialised neurophysiological investigations:** Sleep deprived EEG, video-EEG monitoring.
- **Advanced investigations** (in pts. with intractable focal epilepsy where surgery is considered): Neuropsychology, Semi-invasive or invasive EEG recordings, MR Spectroscopy, Positron emission tomography (PET) and ictal Single photon emission computed tomography (SPECT).
- Lumber puncture and blood culture – if patient is febrile.

Treatment:

- The majority of pts respond to drug therapy (anticonvulsants). In intractable cases surgery may be necessary. The treatment target is seizure-freedom and improvement in quality of life!

- Basic rules for drug treatment: Drug treatment should be simple, preferably using one anticonvulsant (mono-therapy). "Start low, increase slow". Poly-therapy is to be avoided especially as drug interactions occur between major anticonvulsants.

- The commonest drugs used in clinical practice are: Carbamazepine, Sodium valproate, Phenytoin (first line drugs). Lamotrigine, Topiramate, Levetiracetam, Pregabaline (new AEDs).

- If pt is seizure-free for three years, withdrawal of pharmacotherapy should be considered. Withdrawal should be carried out only if pt is satisfied that a further attack would not ruin employment etc. (e.g. driving license). It should be performed very carefully and slowly! 20% of pts will suffer a further sz within 2 yrs.

- The risk of teratogenicity is well known (~5%), especially with valproates, but withdrawing drug therapy in pregnancy is more risky than continuation. Epileptic females must be aware of this problem and thorough family planning should be recommended. Over 90% of pregnant women with epilepsy will deliver a normal child.

- Surgical treatment:

  - A proportion of the pts with intractable epilepsy will benefit from surgery.

  - Epilepsy surgery procedures: Curative (removal of epileptic focus) and palliative (seizure-related risk decrease and improvement of the QOL)

- Curative (resective) procedures: Anteromesial temporal resection, selective amygdalohippocampectomy, extensive lesionectomy, cortical resection, hemispherectomy.
- Palliative procedures: Corpus callosotomy and Vagal nerve stimulation (VNS).

Status Epilepticus

- A condition when consciousness does not return between seizures for more than 30 min or Seizure persists for 30 minutes. This state may be life-threatening with the development of pyrexia, deepening coma and circullatory collapse. Death occurs in 5-10%.
- Status epilepticus may occur with frontal lobe lesions (incl. strokes), following head injury, on reducing drug therapy, with alcohol withdrawal, drug intoxication, metabolic disturbances or pregnancy.
- Treatment: AEDs intravenously ASAP, event. general anesthesia with propofol or thipentone should be commenced immediately.