EEG IN ACUTE SEIZURES AND STATUS EPILEPTICUS

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This Talk:

- Recognize various pattern of EEG seizures
- Recognize nonconvulsive status epilepticus
- Differential diagnosis of SE
- Distinguish between interictal vs ictal EEG
- Controversy ictal EEG pattern
Ictal EEG patterns

♦ A prolongation of a well-defined interictal pattern
♦ Completely different from preceding interictal discharges
Ictal EEG patterns

- Abrupt cessation of interictal epileptiform abnormalities immediately before ictal onset
- Rhythmic repetitive discharges that evolve in frequency, field or amplitude in focal seizures
- Isomorphic patterns such as repetitive interictal discharges in some of the IGE (not observed in focal epilepsy)
- Sudden generalized or lateralized attenuation of amplitude
EEG Seizures (Focal Seizure)

- Repetitive
- Evolution in frequency and morphology and location
- Response to intravenous anticonvulsants
- Postictal slowing or attenuation suggesting cortical dysfunction
Classification of Status Epilepticus

- Clinical: Convulsive
  - Nonconvulsive

- Clinical + EEG: electroclinical
  - Generalized convulsive
  - Generalized non-convulsive
  - Focal convulsive
  - Focal non-convulsive
  - Mixed forms
Nonconvulsive Status Epilepticus

- Seizures are common in ICU, particularly in acute brain injury
- Many seizures in critically ill are nonconvulsive and can only be diagnosed via EEG
- EEG seizures in the critically ill with encephalopathy tend to be of slower frequencies, lasting longer with less clearly defined onset, evolution and offset, and more difficult to recognize
Nonconvulsive Status Epilepticus

- In prolonged nonconvulsice seizures, evolution can be subtle or absent.
- Differentiating between ictal and interictal is often quite difficult
EEG Seizures (Focal Seizure)

- Repetitive
- Evolution in frequency and morphology and location
- Response to intravenous anticonvulsant
- Postictal slowing or attenuation suggesting cortical dysfunction
Differential diagnosis of SE (1)

- Non-epileptic: Postanoxic myoclonus, psychogenic
- Epileptic encephalopathy with severe, nearly continuous interictal EEG changes
  - e.g. CSWS, Lennox-Gastaut S., Angelman S.
- Acute metabolic/vascular/toxic event with impaired consciousness and global EEG changes
  - e.g. encephalitis, stroke (PLEDs and BiPLEDS), severe metabolic encephalopathy
Controversial EEG pattern in ICU

- PLEDs, BIPLEDs, GPEDs
- Triphasic waves
- SIRPIIDs
Periodic Epileptiform Discharges: PLEDs

- Common in the intensive care unit
- Usually recurring every 1–2 s.
- Often (but not always) consist of sharp waves or spikes that may be followed by a slow wave.
- The clinical picture associated with PLEDs is usually obtundation, focal seizures and focal neurological signs.
Periodic Epileptiform Discharges: PLEDs

- The majority of patients with PLEDs will have seizures during the acute stage of illness.
- PLEDs are usually considered an interictal pattern or on an unstable ictal–interictal continuum.
- With time (days–weeks), discharges tend to decrease in amplitude, repetition rate and ultimately discharges cease.
BIPLEDs

- Less common
- Associated with worse mental status and worse outcome than unilateral PLEDs
- Highly associated with seizures during the acute illness.
- postanoxic coma
Generalized Periodic Epileptiform Discharges (GPEDs)

- Postanoxic, after convulsive status epilepticus, Creutzfeldt-Jacob disease, Hashimoto encephalopa and in end-stage Alzheimer disease
- Highly associated with seizures
Triphasic Waves

- Initially described in hepatic encephalopathy, but can occur in any toxic/metabolic encephalopathy.
- Tend to recur at one or two per second and wax and wane throughout a recording, partly.
- Nonconvulsive status epilepticus can appear quite similar.
- EEG alone often cannot distinguish between triphasic waves of metabolic encephalopathy and nonconvulsive seizures. They both resolve with benzodiazepines.
Stimulus-induced Periodic, Rhythmic or Ictal Discharges (SIRPIDs).

- Alerting stimuli (suction, exam, noise, pain) in encephalopathic patients commonly elicit highly epileptiform patterns and often show evolving electrographic seizures.
- Focal or generalized.
- Reproducible with further stimulation.
- The exact clinical, therapeutic and prognostic significance of SIRPIDs remains undefined.
Summary:

- Recognize various pattern of EEG seizures
- Recognize nonconvulsive status epilepticus
- Differential diagnosis of SE
- Distinguish between interictal vs ictal EEG
- Controversy ictal EEG pattern
Thankyou for Your Attention