

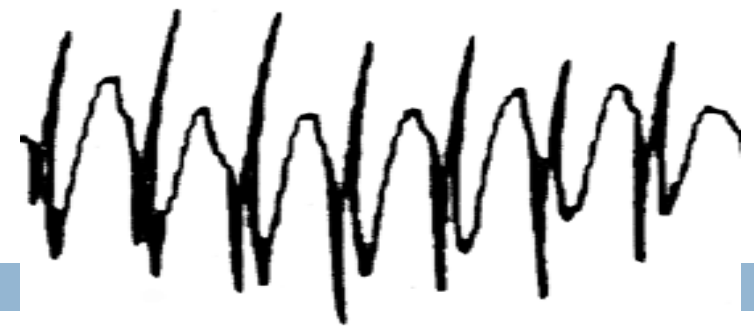
# **EEG IN ACUTE SEIZURES AND STATUS EPILEPTICUS**

Charcrin Nabangchang, M.D.

Phramongkutklao College of Medicine



# 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 anticonvulsant
- 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 nonconvulsive seizures, evolution can be subtle or absent.
- Differentiating between ictal and interictal is often quite difficult



# EEG Seizures (Focal Seizure)

- Repetitive
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# 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, BIPLLEDs, GPEDs**
- **Triphasic waves**
- **SIRPIDs**

# 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.

# BIPLLEDs

- 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

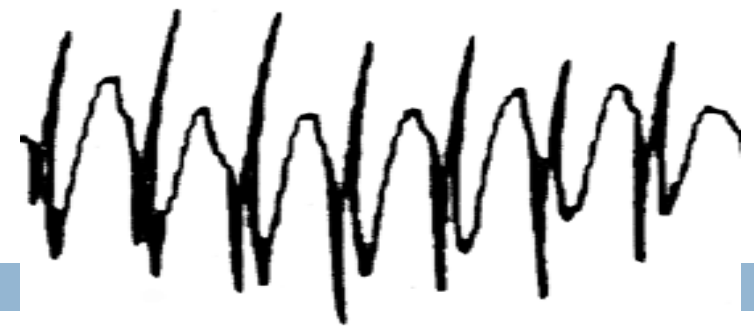
- Initially described in hepatic encephalopathy, but can occur in any toxic/metabolic encephalopathy.
- Tend to recur at one or two per second and wax and wane throughout a recording, partly
- Nonconvulsive status epilepticus can appear quite similar.
- EEG alone often cannot distinguish between triphasic 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
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- Controversy ictal EEG pattern



**Thankyou for Your Attention**