# Emergency epilepsy 2019

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# Talk outline

- Recognising seizure types
- Management of status epilepticus


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# Some definitions

- Epileptic seizure

  A clinical manifestation presumed to result from an abnormal and excessive discharge of a set of cortical neurones

  Provoked = < 7 days from insult

  Unprovoked

- Epilepsy

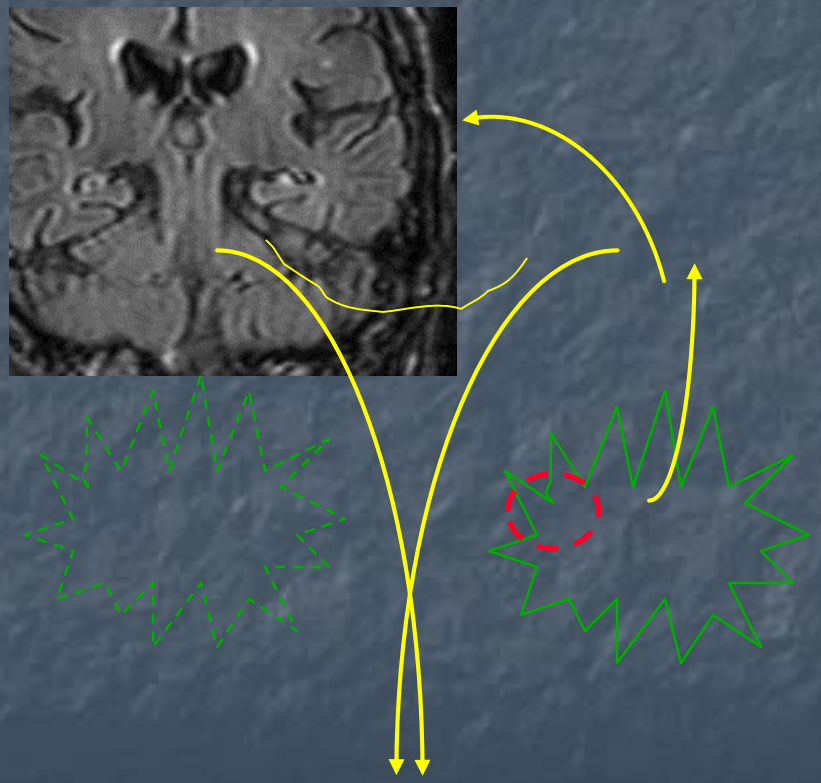
  A condition characterised by recurrent (>2) unprovoked epileptic seizures

- A seizure is a symptom and not a diagnosis

# Classification of seizures

- Partial (partial onset, focal)
  - Simple partial (no impairment of consciousness)
  - Complex partial (with impairment of consciousness)
  - Secondary generalised
- Generalised (primary generalised)
  - Myoclonic jerks
  - Absence (“petit mal”)
  - Tonic-clonic, tonic, clonic, atonic

# Schematic representation of partial seizures



simple partial seizure (aura)

complex partial seizure

secondarily generalised tonic-clonic seizure

# What to ask…..
# N.B. patient and eye witness account is crucial

- Nature of the episode
  - warning symptoms
  - loss or impairment of consciousness
  - duration
  - ? focal onset ?tonic-clonic phase, ?myoclonic jerks
  - unresponsiveness, incontinence, tongue biting, cyanosis
  - post-ictal symptoms: drowsy, confused, headache, myalgia
  - trigger(s): lack of sleep, alcohol
  - headache, dementia, focal deficit etc.
- Associated neurological symptoms, past medical Hx + neurological insults

# Syncope

- typical warning (unless cardiac cause)
- often external triggers
- collapse, usually motionless, short
- myoclonic jerks may occur, simulating a GTC
- incontinence can occur
- recovery rapid, without confusion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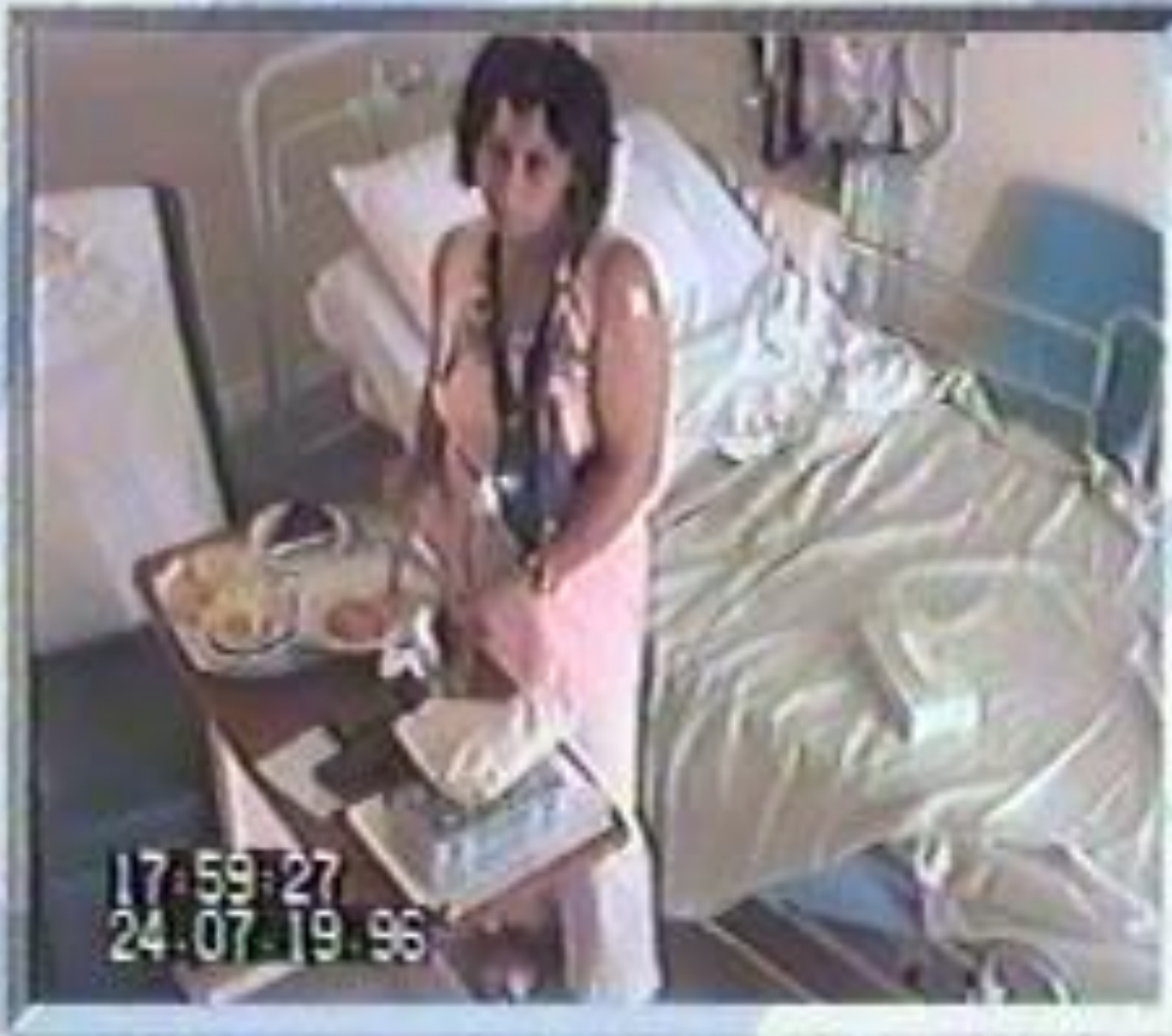
# Non-epileptic seizures

- Difficult to accurately diagnose and usually require videotelemetry
- Diagnosis should be made by a specialist
- Often mixed with epileptic seizures
- Consquences of incorrect labelling of condition extensive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# Investigation of seizures

- Routine haematology/biochem esp. FBC, U&E, LFT, bone chemistry, $Mg^{2+}$, glu, $\gamma$GT, ?urine drug screen
- ECG (acutely) and EEG (usually as outpatient)
- Neuro-imaging * if new onset: CT (?contrast) +/- MRI
- CSF examination if CNS infection/SAH possible

* scan is mandatory if: focal seizure onset, focal signs, middle aged/elderly, >1 seizure, failure to recover, other neurological symptoms, fever

# Seizures and prolactin

- Vukmir. J. Neurol 2004
  - ↑ prolactin in 42 % of seizure patients and 17 % of non seizure patients → sensitivity 42%, specificity 82%
- Cordingly. Am J Em Med ’93
  - ↑ prolactin in 8/11 syncope cases
- Ahmad. Em Med J 2004 – meta-analysis
  - If prolactin > 3x normal then 9 x more likely GTCS than NES and 5 x more likely than syncope

- i.e. not to be relied on - If it is to be measured, measure at 20 minutes and certainly < 1 hr, then again at 24 hrs

# Emergency treatment of seizures

- Airway, Breathing, Circulation assessment
- check for/treat hypoglycaemia, hypoxia, electrolyte disturbance, acidosis
- Pabrinex if suspected alcohol misuse
- self-terminating, brief, single seizures do not require treatment
- IV lorazepam if recurrent/prolonged seizures

# Convulsive status epilepticus

- **Definition**:
  "a condition in which convulsive epileptic activity persists for 30 mins or more". Can be single prolonged or recurrent GTC without clinical recovery in between.
- Most seizures last < 2 min, average 1 minute
- The longer seizures continue, the more refractory to treatment they become
- Seizures lasting more than 5 minutes should be addressed as impending status
- Only 3 controlled double blind studies with specific questions published
- Requires local guidelines and protocols

# Status epilepticus

*Medical History*, 1990, **34**: 185-198.

TEXTS AND DOCUMENTS

## TRANSLATION AND ANALYSIS OF A CUNEIFORM TEXT FORMING PART OF A BABYLONIAN TREATISE ON EPILEPSY

*by*

J. V. KINNIER WILSON and E. H. REYNOLDS *

**Give lorazepam**

# Aetiology of status epilepticus

- 34% low concentrations of AED pts with chronic epilepsy
- 22% CVA
- Anoxia / hypoxia 10%
- Metabolic 10%
- Alcohol and drug withdrawal 10%

# Convulsive status epilepticus

- Basic life support…ABC
  - The most rapid and effective way to secure an airway is to terminate the seizure
  - If intubated, NMJ blocking agents only block the peripheral manifestations of seizures
- Maintain BP
- Check BM
- Give anticonvulsants
- Examine the patient !!

# Convulsive status epilepticus

- Think of underlying cause and treat if possible

  e.g.
  - hypoxic/ischaemic – high mortality
  - encephalitis, metabolic, alcohol
  - secondary generalised from abscess / tumour
  - stroke - common in elderly
  - low AED levels in known epileptic

# Ix in status

- FBC, clotting, U&E, Glu, LFTs, Ca Mg
- Gases
- AED levels
- Serum and urine for toxicology
- CXR
- CT brain

- EEG monitoring

# Drug treatment of convulsive status epilepticus

| | |
|---|---|
| Early | IV lorazepam (or diazepam) |
| Established | IV phenytoin, (fosphenytoin) Consider valproate and/or phenobarbitone. |
| Refractory | Propofol / midazolam / thiopentone anaethesia in ITU |

# First Line drugs
# Diazepam or lorazepam ?

## Diazepam

- Peak concentrations 3 – 15 mins post IV
- Rapid fall in plasma level with redistribution to muscle
- After repeated dosing, saturated fat and muscle stores leading to risk of CNS / cardiorespiratory depression

## Lorazepam

- More effective as rapidly as diazepam
- Long duration of action
- Little risk of accumulation
- Less likely to require intubation

# Second line drugs

## Dept Vet Aff Co-operative study
## NEJM 1998

**Four treatment regimens tried**

**- lorazepam**
**- phenytoin**
**- phenobarb**
**- diazepam and phenytoin**

| % responding to | |
|---|---|
| First agent | 56% |
| Secong agent | 7% |
| Third agent | 2.3% |
| Any other agent | 23.2% |
| Not responding | 11% |

# Second line drugs
## phenytoin

- Effective in 10-30 minutes
- Loading dose of 1000 mg often ineffective – should be 18-20 mg/kg
- Rate < 50 mg/min, cardiac monitor
- If not effective give extra 5-10 mg /kg
- Then 100 mg tds

- Fosphenytoin
  - Pro-drug of PHT without propylene-glycol carrier
  - Therapeutic in 10 minutes
  - Given as phenytoin equivalents

# Second line drugs
## phenobarbitone

- Very effective in status if adequate doses
- Particularly good for secondary generalised
- Load at 20 mg / kg, then 45-90mg bd
- Respiratory and circulatory depression at high doses

# Second line drugs
## valproate

- Less sedating than PB
- Load at 15 mg / kg, then 1mg / kg / hr
- Higher doses have been used up to 40 mg / kg loading and 6 mg / kg / hr
- Less cardiovascular or respiratory depression that PHT / PB
- Watch for ammonium

# Then what ?

- **Alert anaesthetist and transfer to ITU if:**
  - **If seizures not controlled in 10 minutes with lorazepam and PHT/PB or VAL**
  - **Failure to maintain $O_2$ saturations**
- **Note in persistent coma after termination of overt seizures, 50% will have electrographic seizure activity**
- **They need anaesthetics – continued seizures cause**
  - **Tachyarrhythmia, pulmonary oedema, rhabdomyolysis**
  - **Cortical damage and long term neurological dysfunction**

# Pentobarbital vs midazolam vs propofol on ITU

- Mixed data from comparative studies
- Seizure control:
  - PB > midazolam = propofol
- Mortality
  - Propofol > midazolam = PB
- Safety profile
  - Midazolam > PB > propofol
- Thiopentone is often used PB equivalent in Europe

# On ITU

- May need pressors to maintain BP, monitoring required
- May require treatment of acidosis if hypotensive and pH < 7
- Watch out for complications e.g ileus and rhabdomyolysis
- Monitor the EEG

# EEG monitoring on ITU

- Ideally continous EEG monitoring relayed to neurophysiology department
- Second best – daily EEG recordings
- Cerebral function monitors and amplitude integration EEG devices
  - Dependent on interpretation – training
  - Often artefacts misinterpreted
  - Patient needs to be paralysed

# Last resorts

- Topiramate e.g. 200 - 700 mg bd via NGT
- Levetiracetam up to 1500 mg bd via NGT
- Ketamine if neuroimaging normal

# Bed 1

- 30 yr old lady presented with first seizure – witnessed by boyfriend
- Some sleep deprivation as trigger
- Normal birth history and milestones
- No FH of seizures
- Whole body stiffened, clonic jerking of arms and legs
- Slightly confused post ictally but normal by 2 hrs
- Left lateral tongue biting
- Examination normal

# Bed 1
# What do I do now?

1. Discharge with letter to 'first fit' clinic

2. CT scan

3. Give valproate and discharge

4. Give carbamazepine and observe for 24 hrs

# “red flag” situations necessitating admission

- >1 seizure in 24 hours
- Failure to recover fully after seizure
- Pregnancy-associated or post-partum seizures
- Worrying associated symptoms:
  - Fever, rash
  - Prodromal or severe post-ictal headache
  - Confusion, hallucinations, drowsiness
- Focal neurological symptoms or signs (of probable recent onset)

# Patients with single self terminating generalised seizure and full recovery

- can be discharged home if examination, bloods, ECG + CT brain (if done) normal
- book outpatient EEG and refer for urgent OP appt
- discuss starting Rx with on-call neurology SpR if previous GTC seizures or additional seizure types eg. myoclonic jerks, partial seizures
- Inform that must not drive + give safety advice

# Take home points

- Context of attacks  e.g witness history
- What kind of seizure ?
- Look for precipitants
- ABC to N
- Lorazepam best first choice
- Give enough phenytoin
- Barbiturates / midazolam / propofol