Epilepsy

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Epilepsy
Outline of talk

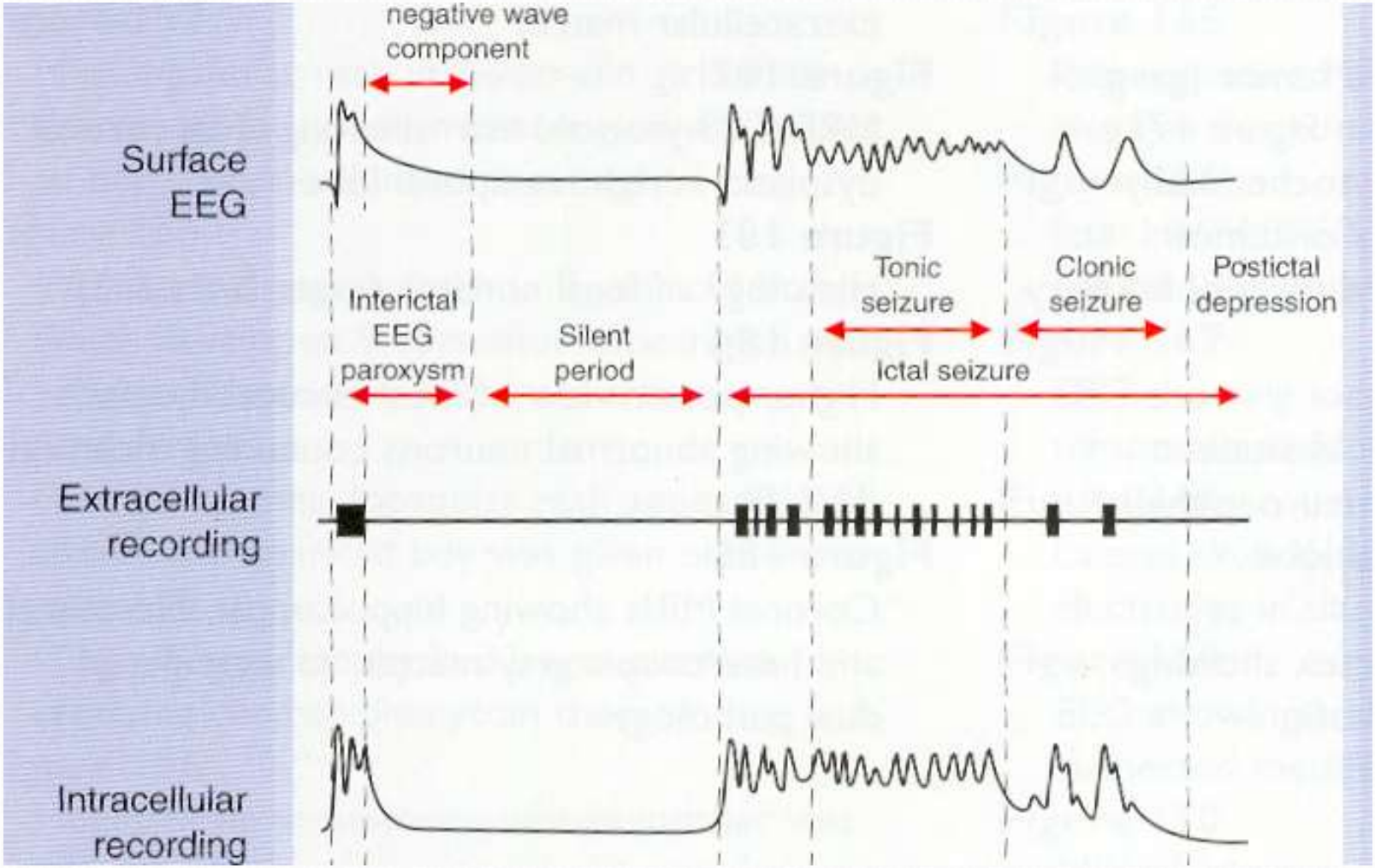
- Definition of epilepsy
- Diagnosis of epilepsy
- Treatment of epilepsy
- Complications
- Problems with management of epilepsy

Epilepsy

- 300,000 in UK 5-10/1000
- 1500-3000 patients per DGH
- Lifetime prevalence 2-5%
- 1000/year die as result of epilepsy
- Women of child bearing age make up 25% of epileptics
- 3-4/1000 pregnancies
- 1800-2400 children born to mothers with epilepsy

Epilepsy

Epileptic seizures are symptoms of cerebral dysfunction, resulting from paroxysmal hyperexcitable or hypersynchronous discharges of neurons involving the cerebral cortex.


negative wave component
Surface EEG
Interictal EEG paroxysm
Silent period
Tonic seizure
Clonic seizure
Postictal depression
Ictal seizure
Extracellular recording
Intracellular recording

Seizures

- Generalized seizures are genetic and due to disorders of ion channels and other important aspects of the action potential process and may involve basal ganglia and cortex
- Focal seizures reflect a disorder of the local neural network in the cortex and the relative balance of excitatory and inhibitory mechanisms

Epilepsy

- Clinical manifestations are extremely variable and depend on the cortical areas involved.
- Generalised Seizures are usually self-limited, lasting a minute or two & a half, and may be followed by a period of post-ictal cerebral depression manifested clinically as diffuse or localized neurologic deficits.
- Complex partial seizures last up to 4-5 minutes rarely longer
- Epileptic seizures may be reactive, reflecting a natural response of the brain to transient insults such as head trauma, fever, or alcohol withdrawal, drugs or they may result from more permanent pathological processes within the brain.

Epilepsy: international classification of epileptic seizures

I. Partial (focal, local) seizures

- A. Simple partial seizures
  1. With motor signs
  2. With somatosensory or special sensory symptoms
  3. With autonomic symptoms or signs
  4. With psychic symptoms
- B. Complex partial seizures
  1. Simple partial onset followed by impairment of consciousness
  2. With impairment of consciousness at onset
- C. Partial seizures evolving to secondarily generalized seizures
  1. Simple partial seizures evolving to generalized seizures
  2. Complex partial seizures evolving to generalized seizures
  3. Simple partial seizures evolving to complex partial seizures evolving to generalized seizures

II. Generalized seizures (convulsive or nonconvulsive)

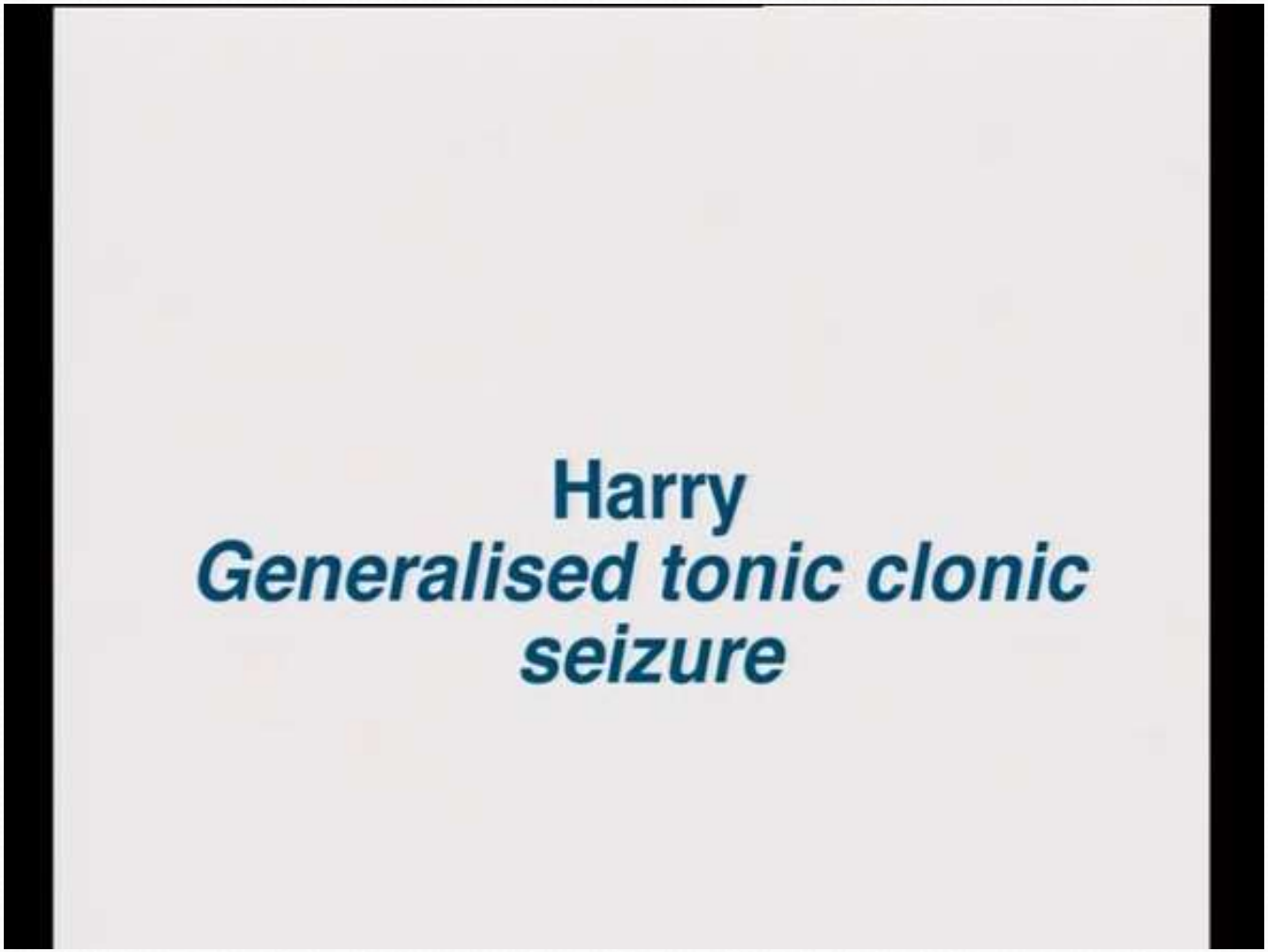
- A. Absence seizures
  1. Typical absences
  2. Atypical absences
- B. Myoclonic seizures
- C. Clonic seizures
- D. Tonic seizures
- E. Tonic-clonic seizures
- F. Atonic seizures (astatic seizures)

III. Unclassified epileptic seizures

Epilepsy

- Partial seizures…….55%
  - Complex partial ……..15%
  - Simple partial……5%
  - Partial seizures with 2ry generalization…35%
- Generalized (convulsive) seizures……35%
- Unclassifiable……10%

TONIC CLONIC SEIZURE



syncope

syncope

COMPLEX PARTIAL TEMPORAL SEIZURE

COMPLEX PARTIAL FRONTAL SEIZURE

ABSENCE SEIZURE

NON EPILEPTIC SEIZURES

Diagnosis of Epilepsy

- Diagnosis in epilepsy requires first determining that an ictal event in question is epileptic.

Differential diagnosis of intermittent symptoms

- Many systemic, neurologic, and psychiatric conditions are associated with intermittent symptoms that can be mistaken for epilepsy,
- syncope,
- hyperventilation,
- toxic and metabolic disturbances,
- cardiovascular disorders,
- sleep disorders,
- paroxysmal dyskinesias,
- hyperekplexia

Differential diagnosis of intermittent symptoms

- hemifacial spasms,
- paroxysmal vertigo,
- trigeminal neuralgia,
- migraine,
- transient global amnesia,
- psychogenic seizures,
- episodic dyscontrol
- psychiatric dissociative states

Epilepsy
Diagnosis

- Clinical in general (need Neurological opinion)
- Need witness account
- Differential diagnosis of blackout 9/10 syncope
- Need to consider seizure secondary to anoxia, cardiac arrythmia, hypotension, alcohol, drugs and hypoglycaemia
- For first seizure need to consider focal brain pathology and an MRI scan is generally required

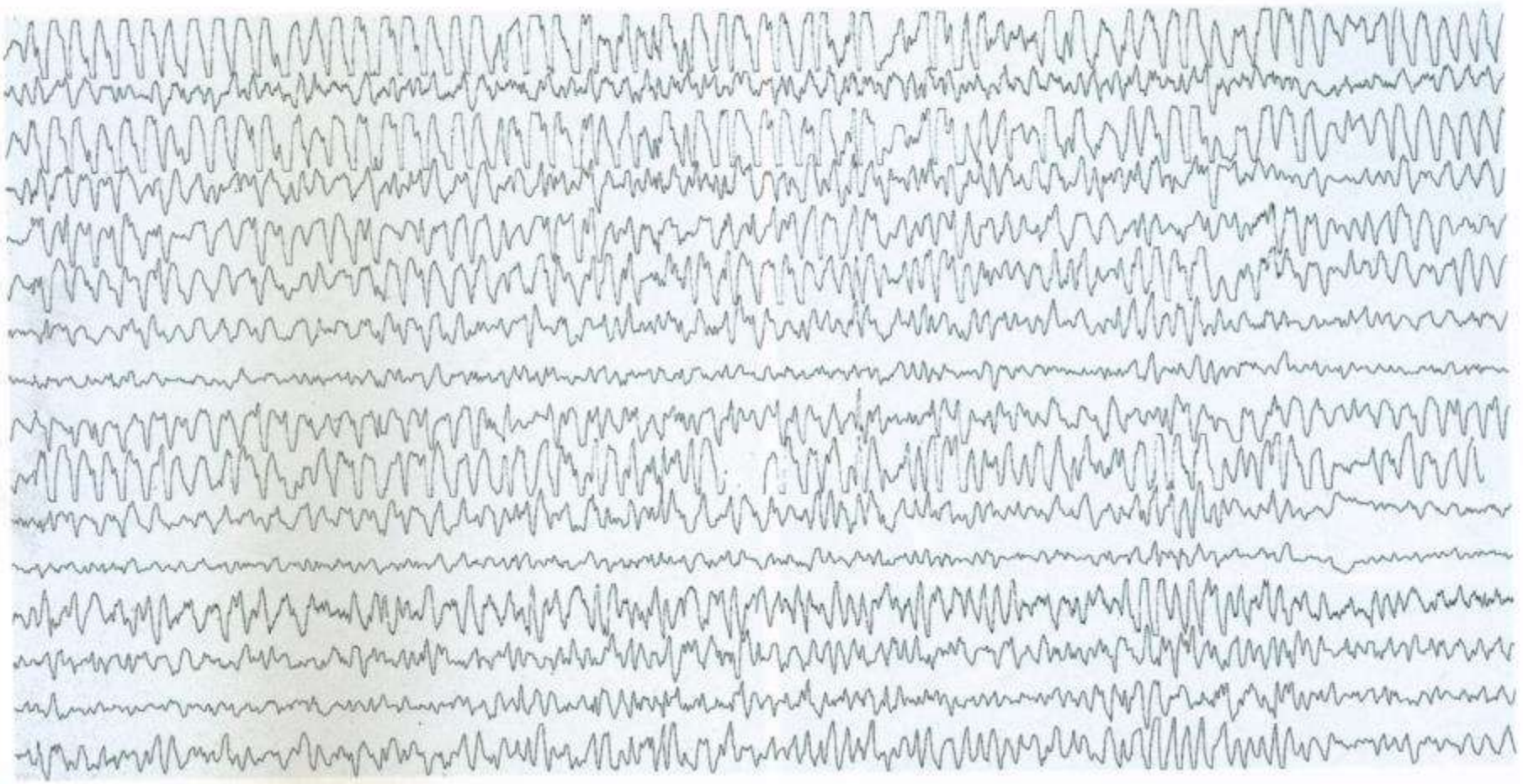
Epilepsy
Diagnosis

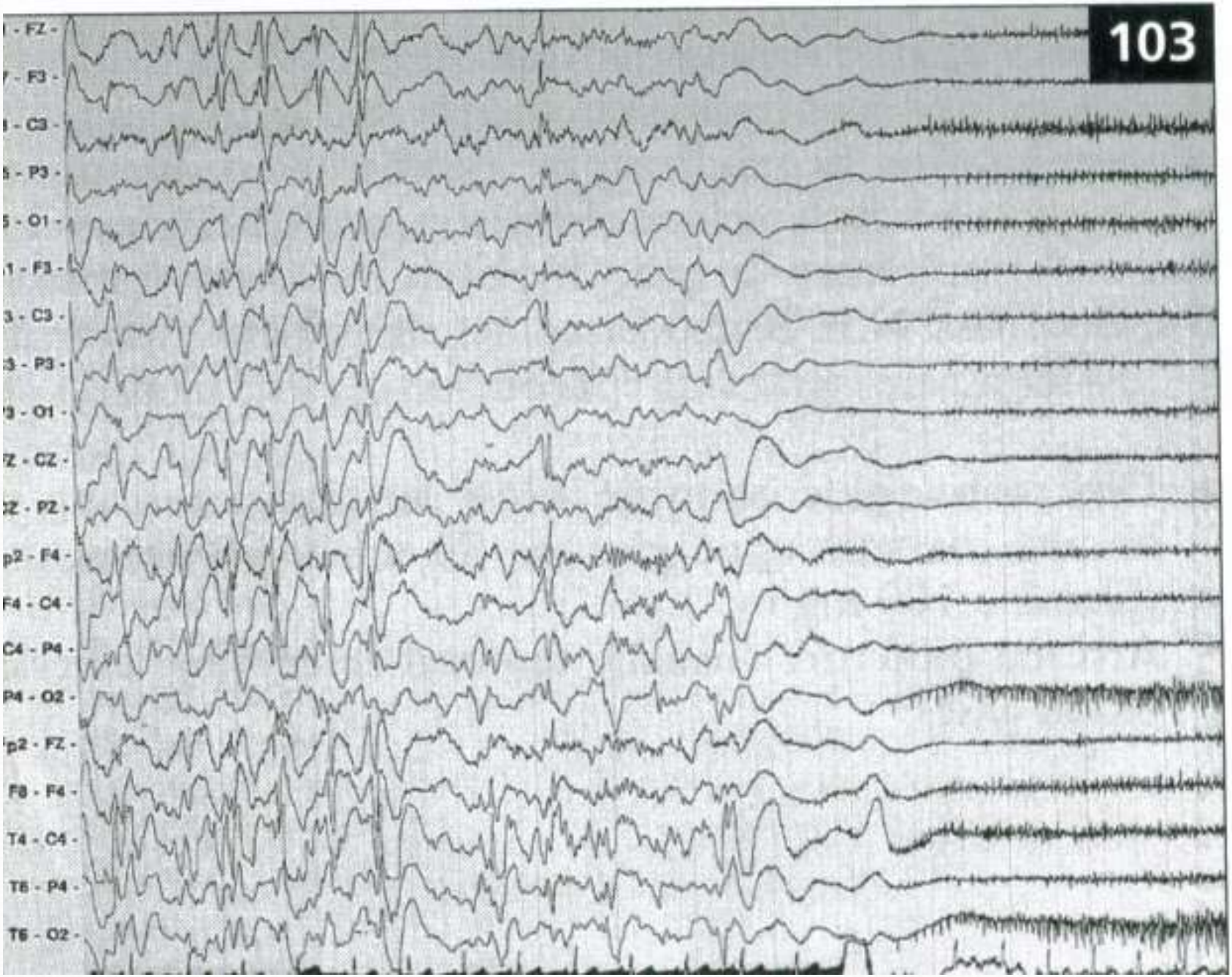
- MRI scan
- EEG is not diagnostic generally
- Metabolic screen,
- Haematology screen including clotting
- VDRL
- ECG
- Epilepsy is a continuing tendency to seizures.

Syncope v seizure

- Syncope
  - Nausea, vomiting, cold, sweating
  - Gradual onset
  - Duration few sec
  - Jerks always short and after LOC
  - Incontinence rare
  - Tongue bite rare
  - Very pale
  - Postictal confusion rare
  - Recovery rapid
- Seizure
  - Aura common
  - Usually sudden
  - Duration 1-3 min
  - Jerks usually prolonged and coincide with LOC +automatism
  - Incontinence common
  - Lateral Tongue bite
  - Pale, red or blue
  - Postictal confusion common
  - Recovery slow

Non convulsive status

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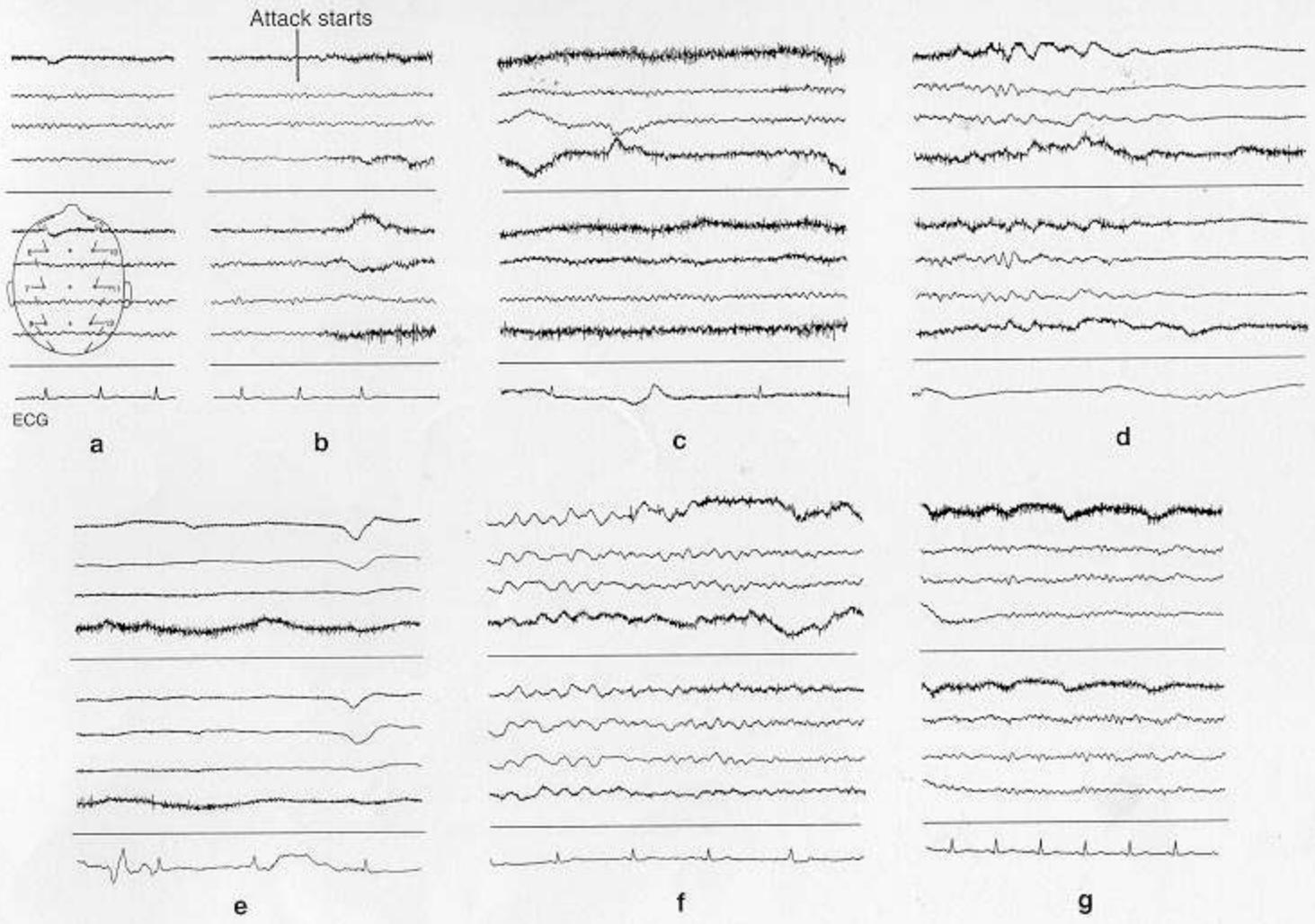
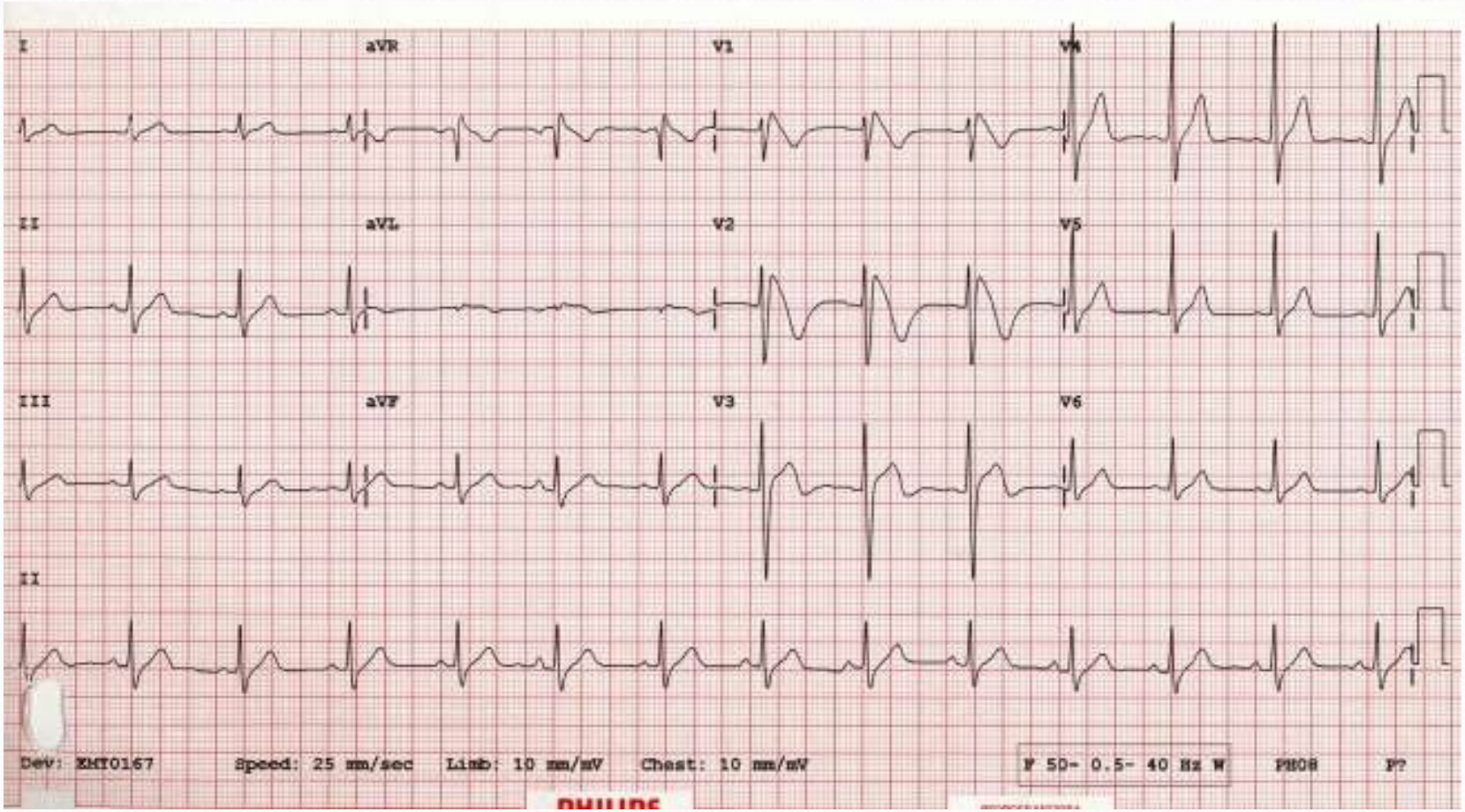
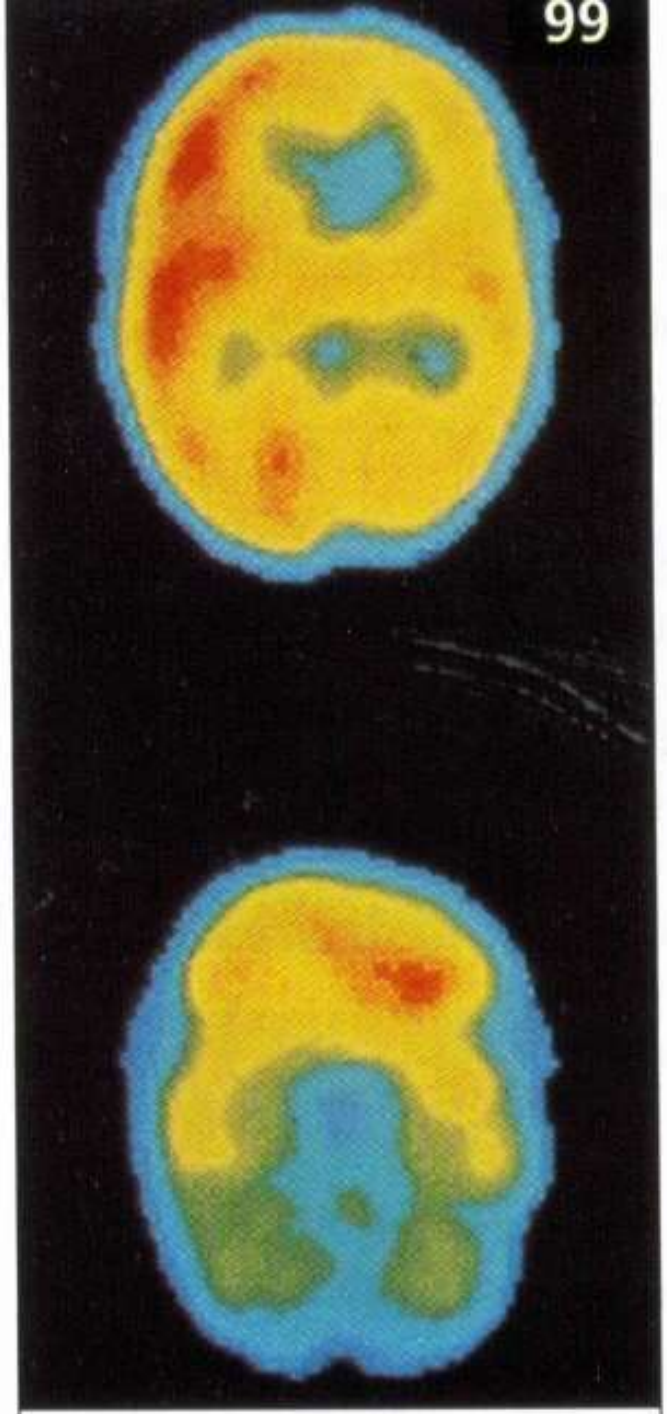
- FZ -
- F3 -
- C3 -
- P3 -
- O1 -
1 - F3 -
3 - C3 -
3 - P3 -
3 - O1 -
Z - CZ -
2Z - PZ -
p2 - F4 -
F4 - C4 -
C4 - P4 -
P4 - O2 -
p2 - FZ -
F8 - F4 -
T4 - C4 -
T5 - P4 -
T6 - O2 -


Attack starts
ECG
a
b
c
d
e
f
g


I
aVR
V1
V4
II
aVL
V2
V5
III
aVF
V3
V6
II
Dev: XMT0167
Speed: 25 mm/sec
Limb: 10 mm/mV
Chest: 10 mm/mV
F 50- 0.5- 40 Hz W
PH08
P?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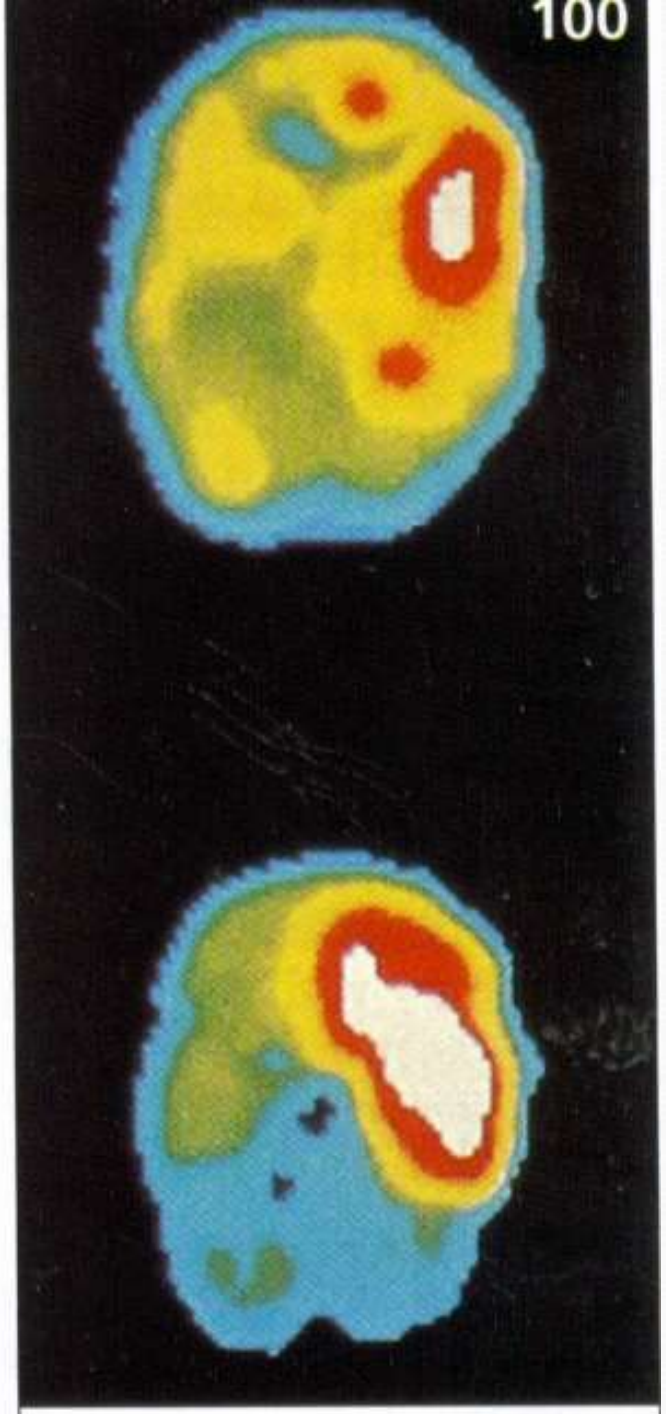
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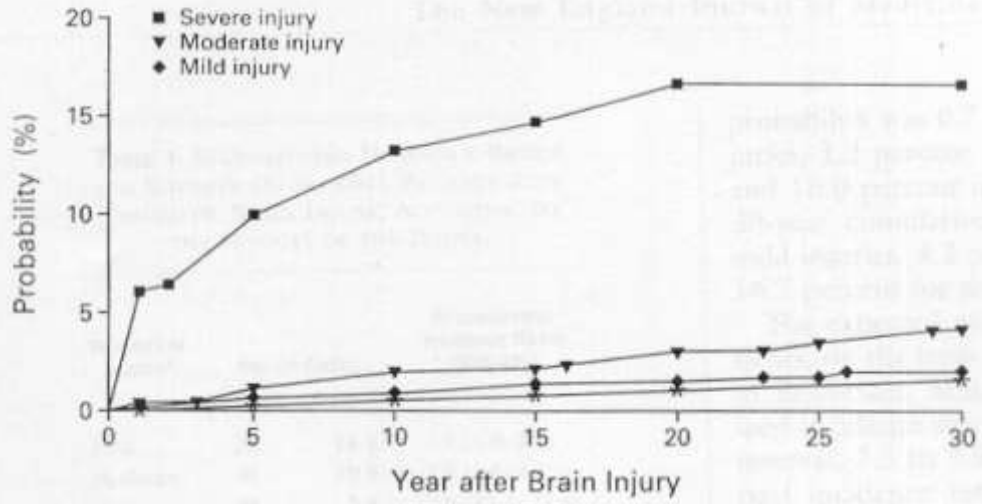
Epilepsy

- Meningiomas
- Arteriovenous malformations
- Saggital sinus thrombosis
- Low or high grade gliomas
- Pituitary apoplexy

Seizures after head injury

POPULATION-BASED STUDY OF SEIZURES AFTER TRAUMATIC BRAIN INJURIES

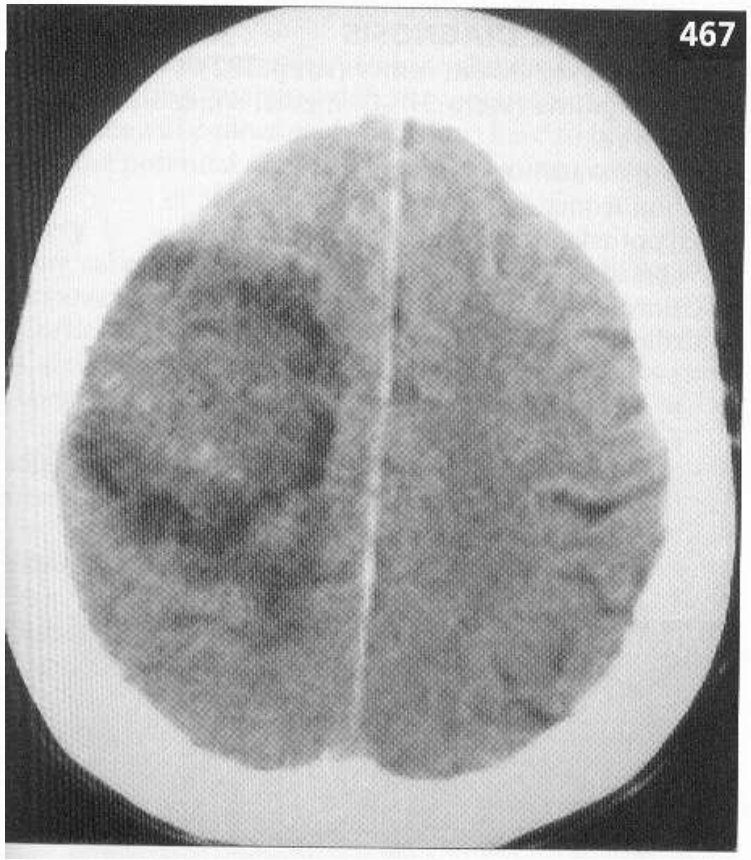


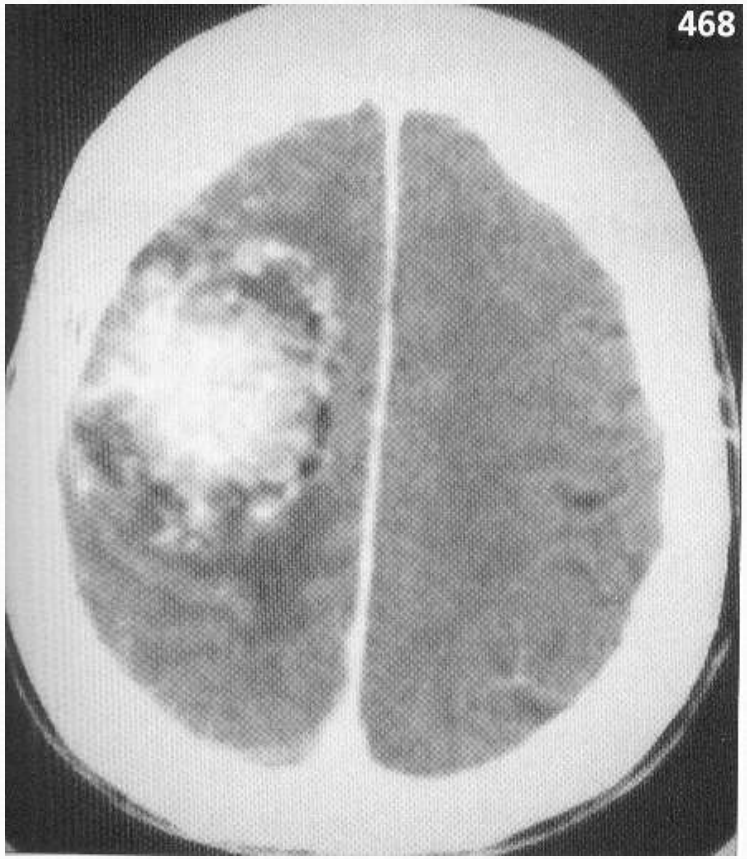
No. of Patients				
Mild injury	2758	1751	1191	609
Moderate injury	1455	934	660	351
Severe injury	328	181	136	74
Total	4541	2866	1987	1034

Figure 1. Cumulative Probability of Unprovoked Seizures in 4541 Patients with Traumatic Brain Injuries, According to the Severity of the Injury and the Incidence of Seizures in the General Population.

The cumulative incidence in the population was derived from incidence rates,[8] with the use of the density method to convert the rates to risk estimates.[9] The asterisks indicate the incidence in the general population at specified points in time.

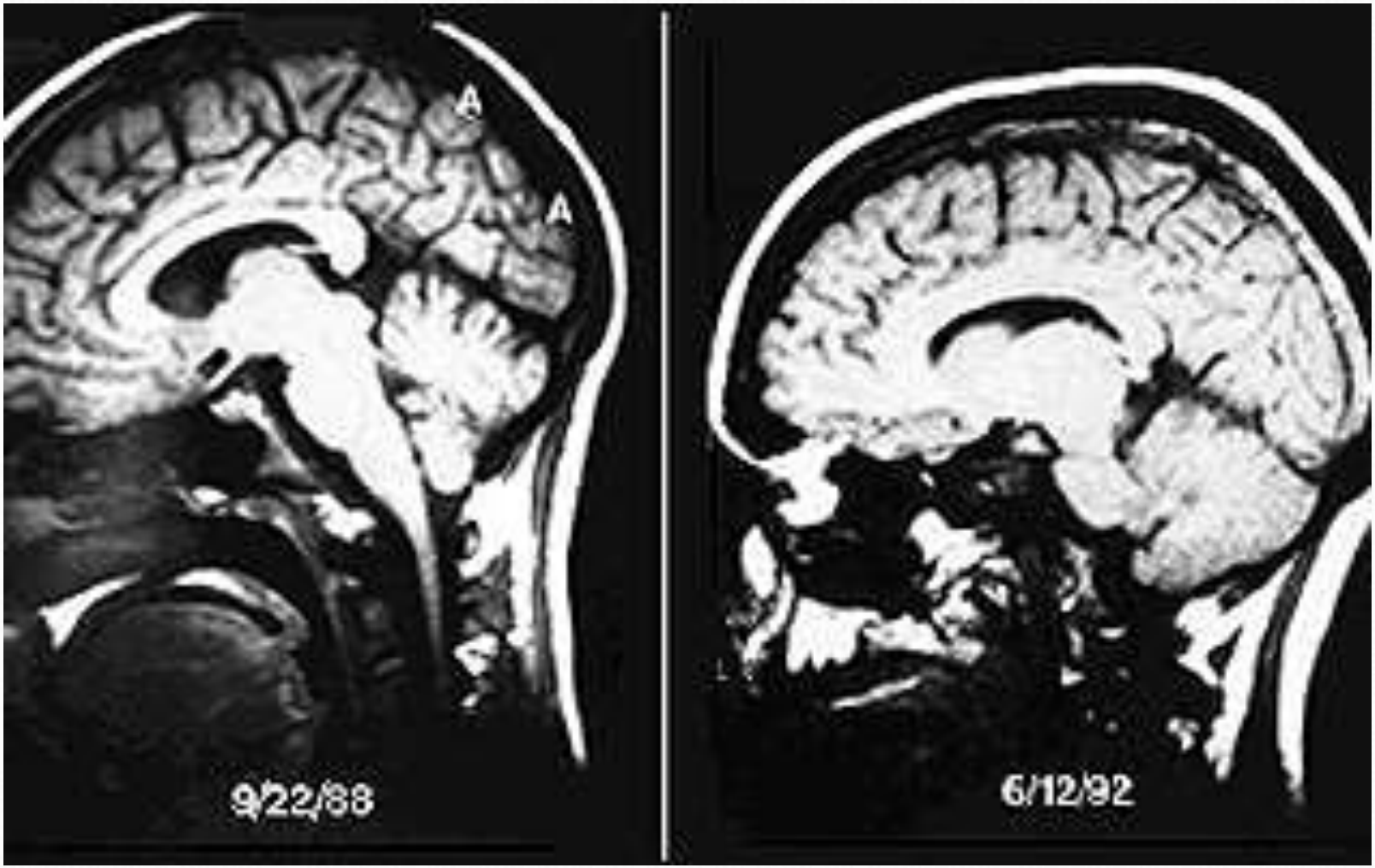
Epilepsy
Meningioma





Epilepsy

Saggital sinus thrombosis



Epilepsy as a paradigm condition

- Episodic disorder
- Clinical diagnosis
- Normal or unhelpful investigations
- Reliant on witness or patients account
- Significant social implications
- Long term medication exposure
- Significant false positive error rate

Epilepsy as a paradigm condition

- The issues raised not unique to epilepsy
- Reliant on information provided by patient and their relatives.
- Read the notes looking for evidence of medically unexplained symptoms
- But need to consider rare diagnoses i.e. porphyria
- Get patients to video attacks at home
- However if attacks frequent enough then can test validity with video telemetry

Patients Misleading

- Because epileptic seizures bar individuals from driving for varying periods patients lie about their seizures i.e details of attacks, frequency etc
- To obtain DLA
- Drug compliance
- Alcohol

Epilepsy as a form of social manipulation

- Epileptic attacks powerful method of manipulation family and friends
- 1/3 of status epilepticus is pseudo status
- Method of avoiding employment
- Clinical conversations about driving and epilepsy used to modify behaviours
- Mixture of epilepsy and non epileptic attacks

Epilepsy as a sign of psychological distress

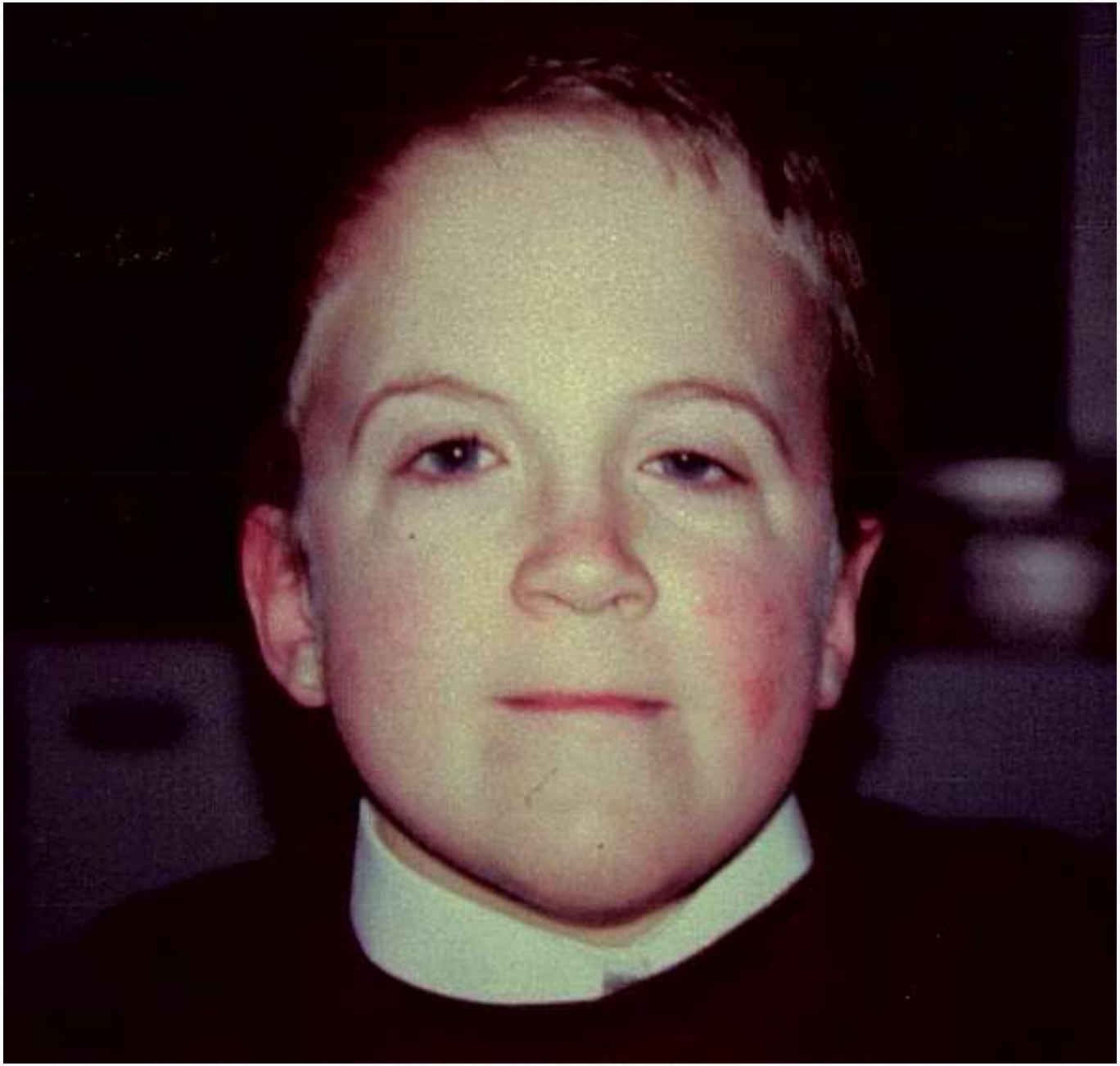
- Makes up a high proportion of video telemetry investigations
- Conversion disorder
- Stereotypies in learning difficulties.
- Facticious disorder
- POTS

Epilepsy and psychiatry

- Depression
- Alcoholism
- Psychosis
- Behavioural change from drugs i.e. kepra lamotrogine
- Cognitive changes
- Apathy

Woman and epilepsy

- Anticonvulsants can affect oral contraceptives
- Effect of seizures on foetus
- Sodium valproate and 25% risk of autism
- 1/3 of pregnant woman stop their medication
- SUDEP 1/200 year on year
- Foetal malformation with anti convulsants



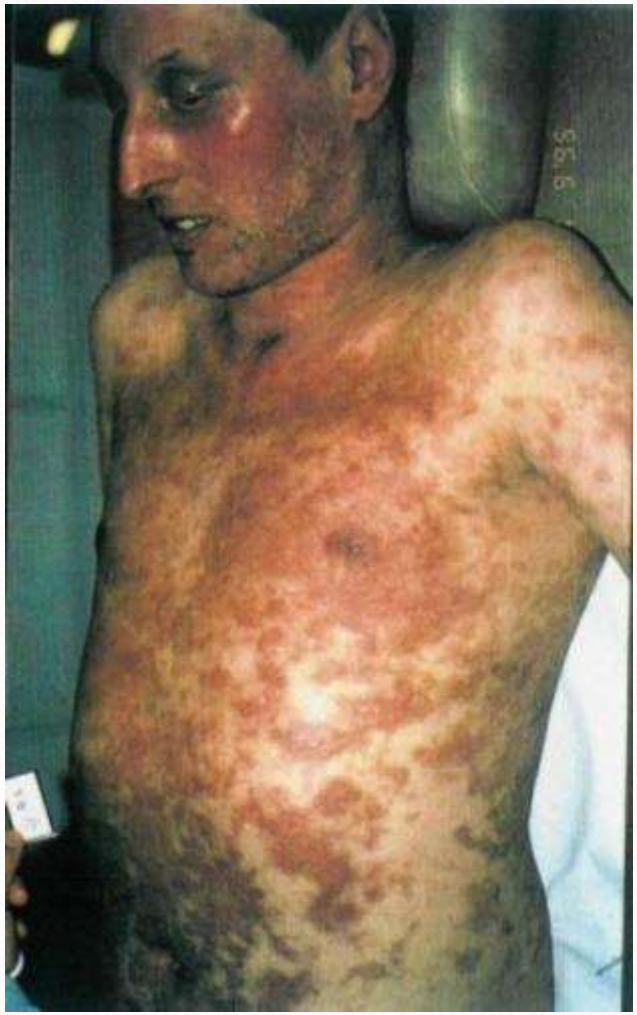
DRUG RASH RACE AND GENETICS

- Mainly with carbamazepine, lamotrogine
- HLA-A*3101, increases the risk of developing a reaction to the drug from 5 percent to 26 percent in Caucasian patients

. HLA-B*1502. This allele occurs almost exclusively in patients with ancestry across broad areas of Asia, including South Asian Indians.[23]

In Europeans a large proportion of sensitivity is associated with HLA-B58.

Stevens johnson syndrome

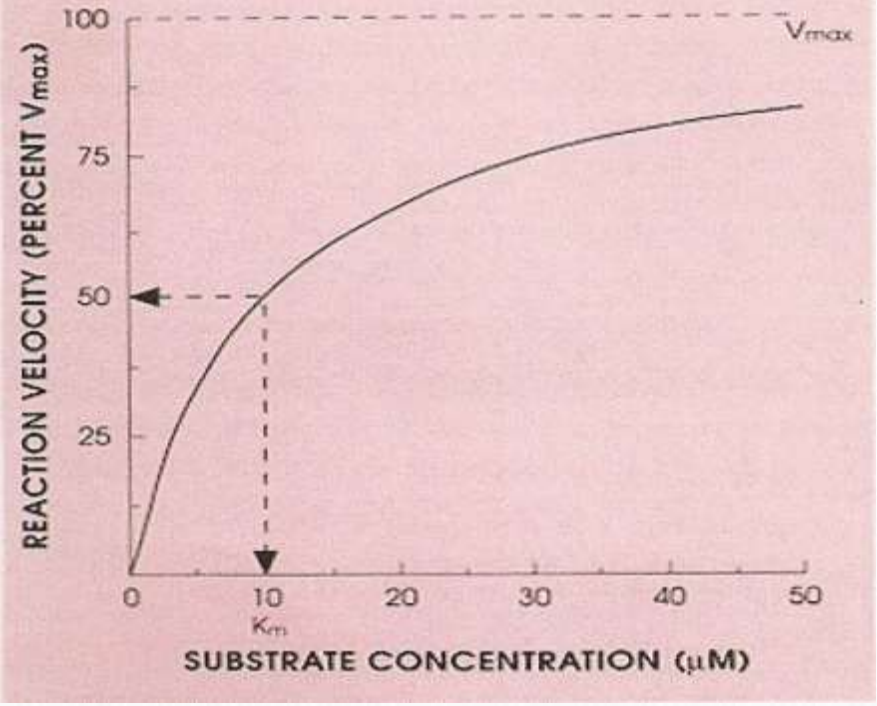


Zero Order Kinetics

Fig. 1

Enzyme kinetics: increase in reaction velocity with increase in substrate concentration. As the substrate concentration increases, saturation of substrate binding to the enzyme active site eventually occurs and a maximal reaction velocity (V_{max}) is reached. The substrate concentration at a reaction velocity which is half V_{max} is called the K_m and is a measure of the affinity of the enzyme for the substrate. The reaction velocity (v) at any particular substrate concentration (S) is given by

$$v = \frac{V_{max} \times S}{K_m + S}$$



Phenytoin kinetics

- Zero order kinetics so a constant amount eliminated per hour
- i.e. alcohol 8.3g/hour
- For a patient with a K_m of 5mg/L
- And a V_{max} of 450mg/day
- Dose of 300 mg gives a concentration of 10 mg/L
- Dose of 360 mg gives a concentration of 20.0 mg/L
- Dose of 400 mg gives a concentration of 40.0 mg/L

Non linear kinetics

- Phenytoin
- Ethanol
- Salicylate
- Theophylline (in some individuals)

Epilepsy

Questions