Approach to Seizures and Epilepsy

A/Prof Doug Crompton
April 2015
Learning objectives

• By the end of this session, students should be able to:
  • demonstrate a neurological medical history, with a focus on seizure as the presenting complaint;
  • understand the crucial importance of time of onset of symptoms;
  • appreciate the understanding of key differential diagnoses for major symptom complexes and their age-related prevalence; and
  • demonstrate key interview techniques including obtaining eyewitness histories.
in other words

- this session is partly about epilepsy and partly about taking a good history …
Overview

• What is epilepsy?
• Different types of seizures
• Differential diagnosis of seizures
• In a later lecture I will talk about:
  • diagnosing epilepsy syndromes
  • tests relevant to epilepsies
  • drugs and surgery
  • treating epilepsy emergencies
Definitions

- Epilepsy is a tendency to recurrent unprovoked seizures
- A seizure is an intermittent, stereotyped disturbance of consciousness, behaviour, emotion, motor or sensory function that results from abnormal cortical neuronal discharges
- Acute symptomatic seizures e.g. associated with alcohol withdrawal, hypoglycaemia are not epilepsy
- Special syndromes (single seizures, childhood febrile seizures) are not epilepsy
Epilepsy is important because…..

- Epilepsy is common
- Epilepsy is often disabling and occasionally fatal
- A diagnosis of epilepsy has huge social implications
- Epilepsy may be the first clue to serious brain disease
- Epilepsy is a diagnosis that doctors often get wrong
Risk Factors for Epilepsy

- Family history of epilepsy
- Childhood febrile seizures
- Perinatal event or abnormal early development
- Other previous brain insult: significant head trauma, stroke, meningitis, encephalitis
Different types of seizure

*Focal*  
(unilateral networks at onset)  
- Simple focal  
- Focal dyscognitive (pka complex partial)  
- Secondary generalised tonic clonic

*Primary generalised*  
(bilateral networks at onset)  
- Absence  
- Myoclonic / Atonic  
- Tonic  
- Primary generalised tonic clonic
Seizure types (1)
Focal seizures

1: seizure starts - onset symptoms may reflect ictal onset zone

2: seizure discharges may spread enough to impair awareness

3: seizure discharge may spread to cause secondarily generalised tonic clonic seizure
Focal seizure symptoms

Frontal lobe: bizarre stereotyped movements; often from sleep

Parietal lobe: somato-sensory seizures

Occipital lobe: visual symptoms coloured circles/patterns

Temporal lobe: déjà vu; autonomic phenomena olfactory, gustatory, auditory
A focal dyscognitive (complex partial) seizure

Section IV: Semiology of Epileptic Seizures
Chapter 39
Automotor Seizures
P. Kotagal
Case 2
Psychic Aura → Right-hemisphere Automotor Seizure
(Right Temporal Epilepsy)
Video from H. Lüders & S. Noachtar 1995
A frontal lobe seizure
Seizure types (2)
Generalised seizures

Sudden onset of epileptic activity on both sides of the brain e.g.

- absence seizures,
- myoclonic seizures
- tonic seizures
- atonic seizures
- primary generalised tonic-clonic seizures
An absence seizure

Section VI: Factors That Precipitate Seizures
Chapter 51
Activation of Seizures by Hyperventilation
I. Drury
Section IV: Semiology of Epileptic Seizures
Chapter 33
Myoclonic Seizures
N. So
Video by H.O. Lüders & S. Noachtar 1995
Case 1
Generalized myoclonic seizure ->
generalized tonic-clonic seizure
(Juvenile myoclonic epilepsy)
Video from H.O. Lüders & S. Noachtar 1995

A myoclonic then generalised tonic clonic seizure
Differential diagnosis of blackout / collapses

• Syncope
  • neurally mediated (reflex) e.g. vasovagal
  • orthostatic hypotension e.g. diuretic induced
  • cardiac arrhythmias e.g. paroxysmal VT
  • structural cardiopulmonary e.g. aortic stenosis

• Functional attacks (pseudoseizures)
Differential diagnosis of blackout / collapses

- remember the tests hardly ever help here, and the important bit of diagnostic equipment is the ...
What does syncope look like?
AUSLÖSUNG DER SYNKOPE

INDUCTION OF SYNCOPE
When assessing a paroxysmal episode must consider:

- Background to patient
- Setting
- Prodrome
- Event
- Recovery

will consider in detail for syncope, then briefly for pseudoseizures, migraine
# Seizures vs syncope: background

<table>
<thead>
<tr>
<th>Favours Syncope</th>
<th>Favours Seizures</th>
</tr>
</thead>
<tbody>
<tr>
<td>• previous syncope</td>
<td>• Hx of seizures or febrile seizures</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Known brain lesion</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Family history of epilepsy</td>
</tr>
<tr>
<td>Seizures vs syncope: setting</td>
<td></td>
</tr>
<tr>
<td>-----------------------------</td>
<td></td>
</tr>
<tr>
<td>Favours Syncope</td>
<td>Favours Seizures</td>
</tr>
<tr>
<td>rising to upright posture</td>
<td>stress</td>
</tr>
<tr>
<td>prolonged standing</td>
<td>sleep deprivation</td>
</tr>
<tr>
<td>pain, fright, needles</td>
<td>photic triggers</td>
</tr>
<tr>
<td>cough, micturition,</td>
<td>drug withdrawal</td>
</tr>
<tr>
<td>hairbrushing etc</td>
<td></td>
</tr>
<tr>
<td>after exercise (vasovagal</td>
<td></td>
</tr>
<tr>
<td>syncope)</td>
<td></td>
</tr>
<tr>
<td>during exercise (favours</td>
<td></td>
</tr>
<tr>
<td>cardiogenic syncope)</td>
<td></td>
</tr>
<tr>
<td>Seizures vs syncope: prodrome</td>
<td></td>
</tr>
<tr>
<td>-----------------------------</td>
<td></td>
</tr>
<tr>
<td><strong>Favours Syncope</strong></td>
<td><strong>Favours Seizures</strong></td>
</tr>
<tr>
<td>nausea</td>
<td>aura may reflect temporal, frontal, parietal or occipital onset in focal epilepsy</td>
</tr>
<tr>
<td>palpitations or dyspnoea</td>
<td></td>
</tr>
<tr>
<td>pallor</td>
<td></td>
</tr>
<tr>
<td>warm sensation, sweating</td>
<td></td>
</tr>
<tr>
<td>light-headedness</td>
<td></td>
</tr>
<tr>
<td>greying of vision</td>
<td></td>
</tr>
<tr>
<td>hearing becomes distant</td>
<td></td>
</tr>
<tr>
<td>Seizures vs syncope: attack</td>
<td></td>
</tr>
<tr>
<td>----------------------------</td>
<td></td>
</tr>
<tr>
<td><strong>Favours Syncope</strong></td>
<td><strong>Favours Seizures</strong></td>
</tr>
<tr>
<td>pallor</td>
<td>tongue biting</td>
</tr>
<tr>
<td>motionless collapse</td>
<td>head turning</td>
</tr>
<tr>
<td></td>
<td>unusual posturing</td>
</tr>
<tr>
<td></td>
<td>cyanosis</td>
</tr>
<tr>
<td></td>
<td>urinary incontinence in bed</td>
</tr>
</tbody>
</table>

*Witness history essential*
<table>
<thead>
<tr>
<th>Seizures vs syncope: recovery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Favours Syncope</td>
</tr>
<tr>
<td>nausea</td>
</tr>
<tr>
<td>rapid recovery to orientation</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>
Differential diagnosis of blackout / collapses

• Syncope
  • neurally mediated (reflex) e.g. vasovagal
  • orthostatic hypotension e.g. diuretic induced
  • cardiac arrhythmias e.g. paroxysmal VT
  • structural cardiopulmonary e.g. aortic stenosis

• Functional attacks (pseudoseizures)
A pseudoseizure

Section XI: Differential Diagnosis of Seizures
Chapter 77
Psychogenic Pseudoseizures
A. Kanner, J. Parra
Video by H.O. Lüders & S. Noachtar, 1995
<table>
<thead>
<tr>
<th>Favours Pseudoseizures</th>
<th>Favours Seizures</th>
</tr>
</thead>
<tbody>
<tr>
<td>often background abuse; may be other medically unexplained Sx</td>
<td>may be background brain injury or FH epilepsy</td>
</tr>
<tr>
<td>attacks variable</td>
<td>attacks stereotyped</td>
</tr>
<tr>
<td>attacks often wax and wane</td>
<td>attacks evolve then stop</td>
</tr>
<tr>
<td>flurries of attacks common</td>
<td>attacks usually 1-2 / day (except absences, NFLE)</td>
</tr>
<tr>
<td>attacks often prolonged eg 20 mins</td>
<td>attacks &gt;4 mins uncommon</td>
</tr>
</tbody>
</table>

when in doubt always treat as epilepsy
Differential diagnosis of other seizure types includes

- migrainous visual aura [occipital seizures]
- transient ischaemic attacks (usually negative symptoms) [focal seizures]
- metabolic dysfunction e.g. hypoglycaemia [focal seizures]
- tinnitus [lateral temporal seizures with auditory aura]
- physiological *deja vu* [mesial temporal seizures]
- parasomnias [frontal seizures]
- movement disorders (e.g. hemiballismus, paroxysmal dyskinesias) [frontal seizures]
<table>
<thead>
<tr>
<th>Occipital Seizures vs Migraine</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Favours Migraine</strong></td>
<td><strong>Favours Occipital Seizures</strong></td>
</tr>
<tr>
<td>Flickering, uncoloured zigzags, central zigzags, may leave scotoma</td>
<td>Bright shapes, single or multiple, usually coloured, may start in one hemifield and move</td>
</tr>
<tr>
<td>Typically 15-60 mins</td>
<td>Seconds to minutes occasionally hours</td>
</tr>
<tr>
<td>Confusion rare</td>
<td>Confusion common</td>
</tr>
<tr>
<td>Unilateral pounding headache usual</td>
<td>Headache variable, often mild</td>
</tr>
</tbody>
</table>
A couple of cases to finish off ...
Case 1

A 23 year old man, referred with “blank spells” preceded by a feeling of déjà vu.
His friends say he looks confused, licks his lips and fiddles with his clothes. Mum says when he was 2 he had a febrile seizure lasting 50 minutes.
diagnosis ?
Case 1- investigations

EEG shows localised discharges in right temporal region

MRI shows area of gliosis (scarring) in right temporal lobe

Diagnosis – Focal epilepsy, (mesial temporal lobe epilepsy secondary to febrile status epilepticus)
Case 2

- 18 year old female
- presented to hospital with 3 seizures in one day, recent febrile illness
- discharged from hospital on phenytoin
- referred to outpatient clinic
More History

• Patient has no recollection of events

• Patients mother witnessed one of the three events
  • Generalised stiffening and convulsions
  • Bit side of tongue, no urinary incontinence
  • Post-ictal confusion, cyanosis

• Similar event 8 months ago, ~2 am after attending wedding, no clear diagnosis made

• No other medical conditions, etc.

• Investigations in Emergency Dept non-contributory
Yet more history

- No epilepsy risk factors
- Mother described blank spells: patient staring for a few seconds and slow to respond to question
- Mother and daughter describe whole body jerks while awake (morning predilection)
diagnosis ?
Case 2: tests

- EEG: generalised poly-spike wave and spike-wave discharges with photo-epileptiform response
- Diagnosis: juvenile myoclonic epilepsy
- medication given will make her myoclonic jerks worse
thanks for your attention - any questions?