An Introduction to Epilepsy

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Outline

• Principles of accurate diagnosis
• Principles of antiepileptic drug therapy
• Initial selection of antiepileptic drugs
• Comprehensive management: non-AED issues

Principles of accurate diagnosis
Definitions and epidemiology

• An epileptic seizure is a sudden change in behavior that is the consequence of electrical hypersynchronization of neuronal networks involving the cortex.
• 10% of population experience a single seizure; 0.5-1% of population experience recurrent epileptic seizures (epilepsy).

Seizures that are not epilepsy

• Some seizures are provoked – this is not epilepsy
  – Derangement of glucose, Na, Ca, Mg, Tc, Cr, etc.
  – Drug (e.g., benzodiazepine) or alcohol withdrawal
  – Acute brain damage (stroke, trauma)
• Nonepileptic seizures
  – Sudden changes in behavior that resemble epileptic seizures but are not associated with typical EEG changes.

Disorders that mimic seizures

• Syncope
• Psychological disorders; e.g., PNES
• Sleep disorders, e.g., narcolepsy/automatic behavior
• Paroxysmal movement disorders
• Transient global amnesia
• Transient ischemic attack
• Drop attacks
• Toxic/metabolic states
• Complicated migraine
Seizure types

- Accurate classification requires careful history from patient and observers
- Has implications for AED selection and risk of underlying lesion
- Generalized
  - Tonic-clonic; Absence; Myoclonic
- Partial
  - Simple partial; Complex partial; Secondary generalized
- Features for each described in other lectures in this series

Evaluation of seizures

Primary goal:
- Did the seizure result from:
  - A treatable systemic process
  - Intrinsic dysfunction of the CNS
    - If so, what is the underlying brain pathology?
- This evaluation determines
  - The likelihood of additional seizures
  - Whether to begin AED therapy
  - The appropriate treatment for the underlying cause, if any

Evaluation of seizures (2)

- < 50% of patients have an identifiable cause
- Some others have genetically determined epilepsy
- Etiologies among those with an identifiable cause:
  - Head trauma
  - Degenerative diseases (esp. elderly)
  - Brain tumor (esp. elderly)
  - Stroke (esp. elderly)
  - Intracranial infection
  - Congenital brain malformation (esp. children)
  - Inborn errors of metabolism
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Evaluation of seizures (3)

• History of the event
  – Review of preceding activities
  – Prodromal symptoms (auras)
  – Description of seizure
    • Mental status
    • Motor function
  – Post-ictal behaviors/symptoms
    • Focal lateralizing signs
    • Time to recovery

Evaluation of seizures (4)

• Medical history
  – Head injury
  – Cerebrovascular or cardiovascular disease
  – Progressive cognitive dysfunction
  – Infections (e.g., encephalitis, meningitis)
  – Febrile convolution
  – Alcohol or substance abuse
  – Cancer

Evaluation of seizures (5)

• Neurological examination
  – Focal/lateralizing findings
• Laboratory evaluation
  – EEG and neuroimaging study (MRI preferred); Repeat EEG with sleep if routine unrevealing
  – Routine laboratory assessment
  – Toxicology if indicated by encephalopathy
  – CSF if cerebral infection suspected

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Principles of AED therapy

Goals of therapy
- Fully controlling seizures
- Minimal if any side effects with easy regimen for patient to follow
- Maintaining or restoring quality of life
- Anti-epileptic drugs only treat the symptoms, not the underlying cause
  - It is therefore necessary to take the drugs “day in and day out” for a prolonged period of time

Optimal treatment plan
- Based on:
  - Accurate diagnosis of seizure type(s)
  - Assessment of the likelihood of further seizures
  - Reliable measure of seizure frequency and severity
  - Evaluation of epilepsy-related psychosocial problems
Optimal treatment plan (2)

• Based on:
  – Working knowledge of available AEDs
  • Mechanisms of action
  • Pharmacokinetics
  • Drug-drug interactions
  • Adverse effects
  • Details of AED pharmacology - discussed in another lecture in this series

Starting AEDs

• Starting an AED should be consistent with making a diagnosis of epilepsy
• The decision to start an AED is important and should rely on the history, neurological examination and lab tests
• Not after a provoked seizure
• After first unprovoked seizure
  – Cortical lesion by neuroimaging
  – Epileptiform EEG
  – Partial seizure, esp. remote symptomatic
  – Focal/lateralizing neurological signs
  – Idiopathic generalized epilepsies
• After second unprovoked seizure

Starting AEDs (2)

• Weigh the social, emotional, and personal implications of making a diagnosis of epilepsy against the potential for further seizures
Discontinuing AEDs

- Factors to consider
  - Natural history of epilepsy
  - Probability that patient will remain seizure-free
  - Duration of seizure-free interval before AED withdrawal
  - Risk factors for seizure recurrence
  - Consequences of recurrent seizures
  - Risks of long-term AED therapy
  - Changes in efficacy of AED if restarted after relapse

Choosing AEDs

- No single AED is optimal for every patient
- Match AED to patient’s seizure type(s)
- Select AED consistent with patient’s other medical conditions and meds, gender (childbearing plans), age, and lifestyle
- Consider safety, ease of use, total costs

Choosing AEDs (2)

- About 50% of patients with new diagnosis of epilepsy will become seizure free with first tolerable AED
- During first 6 months of treatment, tolerability is as important as efficacy in success of AED
- Start low and slowly advance dose to maximum tolerated; Adjust amount or timing of dose to reduce side effects
Choosing AEDs: elderly

- Avoid AEDs that may worsen current medical problems or cause drug interactions
- Start with low doses and increase dosage slowly: aim for half of usual adult dose

Comprehensive management: non-AED issues

Strategies to enhance outcomes

- Education
  - Before treatment begins, explain diagnosis and treatment plan, importance of compliance, and tracking seizures (calendar) and side effects
  - Discuss reasons for follow-up visits
  - Refer to lay organizations, local resources
- Dosage
  - Limit number of drugs and pills, daily doses; Recommend pill box
Strategies to enhance outcomes (2)

- Patient education resources
  - International Bureau for Epilepsy
    - http://www.ib-e-epilepsy.org/
  - Epilepsy Foundation
    - www.epilepsyfoundation.org
  - Epilepsy Therapy Project
    - www.epilepsy.com

Epilepsy-related issues

- Concomitant psychiatric conditions
  - Depression and anxiety
- Stigma, discrimination
- SUDEP
- Lifestyle implications
  - Driving
  - Exercise
  - Alcohol intake

Driving

- Most patients are governed by regulations concerning episodic loss of consciousness or motor control and personal driving privileges
- Countries usually have regulations concerning flying an airplane, or trucks across state or country borders
- Laws vary in:
  - Necessary length of episode-free interval
  - Obligation of physician to notify authorities
Driving (2)

- Important to discuss this topic with any patient with episodic loss of consciousness or motor control and to document discussion in patient's chart

Referral to epileptologist

- Confirm or establish diagnosis of epilepsy, esp. when seizures are atypical or unresponsive to treatment
- Identify seizure type or epilepsy syndrome
- Confirm necessity of specialized diagnostic evaluation
- Evaluate for additional therapy, such as epilepsy surgery
- Decision to stop therapy

Further information

- www.ilae-epilepsy.org/
- www.aesnet.org (American Epilepsy Society)
- www.epilepsy.com/professionals

- Beghi et al. Diagnosis and treatment of the first epileptic seizure: guidelines of the Italian League Against Epilepsy
  *Epilepsia* 2006; 47 Suppl. 5: 2-8

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Conclusion

• The management of epilepsy requires an individualized approach to patients based on:
  – Evaluation
  – Diagnosis
  – Psychosocial factors

“How do you adequately thank someone for giving you back control of your life?”