Overview of Treatment
Kathryn A. O’Hara RN

Epilepsy 101

American Epilepsy Society
Objectives

- Describe the main treatment options for epilepsy
- Identify factors essential in the selection of appropriate medications for epilepsy
Treatment of Epilepsy

- Individuals with epilepsy have a variety of treatment options
  - Medications are the first option and the mainstay of treatment for most people
  - AEDs treat the symptoms, not the underlying disease
  - Surgical procedures and implantable devices are also options that are considered if seizures persist
  - Dietary therapies provide another treatment option in some patients when medicines don’t work
Decision to Treat with Medication

- Most patients with first time seizures are not placed on medications

- Medications to treat seizures are usually called ‘antiepileptic drugs’ or AEDs

- Patients are treated if:
  - two or more seizures
  - abnormal imaging
  - abnormal neurological exam
  - abnormal EEG
  - family history of seizures

- Treatment begins with one drug
Antiepileptic Drugs (AEDs)

Also known as ‘Anti-Seizure Drugs’

Goals of medication therapy:

- No seizures
- No side effects – tailor side effect profile to patient-specific factors
- Improvement in quality of life
Antiepileptic Medications

- Good oral absorption and bioavailability
- Most metabolized in liver but some excreted unchanged in kidneys
- 1st generation AEDs generally have more severe CNS sedation than newer drugs
- Drugs chosen based on mechanism of action, side effect profile, and impact on comorbid conditions, ie. migraine, depression
- Add-on therapy is used when a single drug does not completely control seizures
Ideal Characteristics for AEDs

- Few adverse effects
- High CNS penetrance
- Rapid onset of action
- No or few drug-drug interactions
- Long half-life for daily or twice a day dosing
- Intravenous route available
- Oral liquid preparations important for children and people with impaired swallowing
- Available in different dosage strengths
- Affordable, covered by health insurance
Things to keep in mind...

- Treatment with medication is successful for a large percentage of individuals, but at least 30 to 40% don’t respond to current AEDs.

- Multiple dosing times for medications may lessen adherence.

- Certain types of medications work best for certain forms of epilepsy.
Medication Adherence

- The extent to which a person takes medication as prescribed
  - Also referred to as compliance
  - Using a self-management model, adherence is one aspect of medication-taking behaviors

- Missed AEDs are one of the most common reasons for breakthrough seizures

- Complex medication regimes, poor memory, and cost are barriers to adherence
Pharmacokinetics

- **Absorption**: How long it takes for medicine to be absorbed into the bloodstream
  - Determined by route of intake, may be affected by food
  - Absorption rate can vary for different medicines
  - Meds that may affect rate of absorption should not be given at the same time as AEDs, i.e. antacids

- **Distribution**: How the drug is distributed through the body
  - AEDs with a high degree of protein binding tend to have more drug interactions
**Pharmacokinetics**

**Metabolism and Elimination**: Drugs may be broken down in the liver and excreted through the kidneys

- AEDs metabolized by the liver tend to have more drug interactions

**Bioavailability**: How much drug gets into the brain to work as intended.

- The net result of the absorption, distribution, metabolism, and elimination process
Drug Concentration: Establishing AED Doses

- Some drugs require a large initial dose to achieve a desired concentration in the body, called a ‘loading dose’

- Some AEDs are tolerated better when started at slowly at low doses

- The dose necessary to MAINTAIN a desired concentration over time is called the ‘maintenance dose’ and may vary according to patient and drug specific factors
Laboratory Monitoring

- Serum drug levels serve as a guideline in determining therapeutic dosing.
- Serum levels of newer drugs may not be as important since the therapeutic window for dosing is much larger.
- Additional monitoring (i.e. liver function tests, CBC, or renal function) may be needed, depending on specific drug.
Considerations for AED Choice

- Ability to give alone (monotherapy) or together with other AEDs (polytherapy)
- Side-effect profile
- Need for laboratory monitoring
- Drug-drug and drug-food interactions
- Cost and availability
- Patient’s ability to manage the medication(s)
General Instructions

- Take medications as prescribed on a daily basis to maintain a therapeutic blood level to prevent seizures.

- Do not abruptly stop medications – raises risk for seizure emergencies.

- Factors that can influence how the drug gets into the body, works in the body, and is metabolized and eliminated can interfere with the serum drug levels and interact with other medications.
1st and 2nd Generation AED’s

The oldest drugs used in the treatment of epilepsy include phenobarbital, introduced in 1912, and phenytoin (Dilantin), in use since 1938—these drugs are considered as 1st generation.

2nd generation AED’s have been in place since the early 1990’s.
1st Generation AEDs

- 1857 - Bromides
- 1912 - Phenobarbital
- 1938 - Phenytoin (Dilantin)
- 1954 - Primidone
- 1960 - Ethosuximide (Zarontin)
- 1974 - Carbamazepine (Tegretol)
- 1975 - Clonazepam (Klonopin)
- 1978 - Valproate (Depakote)
2nd Generation AEDs

- 1993- Felbamate (Felbatol)
- 1993- Gabapentin (Neurontin)
- 1995- Lamotrigine (Lamictal)
- 1997- Topiramate (Topamax)
  Tiagabine (Gabitril)
- 1999- Levetiracetam (Keppra)
- 2000- Oxcarbazepine (Trileptal)
- 2000- Zonisamide (Zonegran)
- 2005- Pregabalin (Lyrica)
- 2009- Lacosamide (Vimpat)
- 2009- Rufinamide (Banzel)
- 2010- ACTH (Acthar)
- 2011- Clobazam (Onfi)
- 2012 – Ezogabine (Potiga)
- 2012- Perampanel (Fycompa)
- 2013- Oxcarbazepine (Oxtellar XR)
Newest AEDs (2013 on)

- 2013- Eslicarbazepine acetate (Aptiom)
- 2014- Topiramate XR (Qudexy XR and Trokendi XR)
Generic Drugs

- Generic versions are available for many epilepsy medications

- While FDA states that generic medications are comparable to brand name AEDs, people have reported differences in seizure control and/or side effects during switches between generic to brand, or between different generic formulations

- Patients should discuss the use of generics with their provider

- For more information: AES consensus statement on generic drug substitution
  - https://www.aesnet.org/about_aes/position_statements
Medication Side Effects

- Awareness of common side effects is important

- Side effects can be unpredictable
  - What works well for one person, may not work well for the next

- Side effects can be dose dependent
  - Often depends on person's chemistry and metabolism, height, weight, etc.
  - Most common dose dependent side effects affect the CNS
Types of Side Effects

- **Dose-related**: the higher the dose, the more likely the effect
  - *Common*: drowsiness, irritability, nausea, clumsiness, imbalance, blurry or double vision

- **Idiosyncratic**: Occurs irrespective of dose
  - Changes in appetite or weight change, osteopenia or osteoporosis, cosmetic effects, tremors, fatigue, cognitive effects, mood changes

- **Allergic**: i.e. rash, anaphylaxis
Serious Side Effects

- Prolonged fever
- Rash
- Nausea/vomiting
- Severe sore throat
- Mouth ulcers
- Easy bruising
- Pinpoint bleeding
- Weakness
- Fatigue
- Swollen glands
- Lack of appetite
- Abdominal pain
Drug Interactions

- How well an AED works may be affected by other medications a person is taking.

- Interactions may occur between AEDs or between AEDs and other prescription or over-the-counter medications, for example, warfarin, antibiotics, and other commonly used medications.
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For Nurses Caring for People with Epilepsy

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