Antiepileptic Medications

9/14/2012
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Overview

• Definitions and Treatment Rationale
  – What is a seizure? What is epilepsy?
  – Types of seizures
  – When to treat?
  – Treatment strategies

• Medications
  – Old and new
  – Certain meds for certain seizures
  – Specific medications and side effects
  – General principles and metabolism
Part 1: Definitions and Treatment
Rationale
Seizures

• Definition: sudden surge of electrical activity in the brain that affects how a person acts or feels (epilepsy.com)

• Many varieties
  – Focal v. Generalized

• Often brief and unpredictable

• A single seizure is not epilepsy
Epilepsy

• Definition: a neurologic condition in which a person has 2 or more unprovoked seizures

• Clinical diagnosis

• Many different causes:
  – Brain injury: stroke
  – Genetics
  – Most causes are unknown
When to treat?

• Generally do not treat the first seizure
  – 50% of people with a single unprovoked seizure will not have another seizure
  – If abnormal MRI or EEG the risk of another seizure increases

• Treat after the second seizure

• If a person has 2 seizures approximately 75% have further seizures
Treatment Strategies 1.

• NO SEIZURES AND NO SIDE EFFECTS
• Determine what type of seizures a person has
  – History, MRI and EEG
• Choose medicine based on
  – Type of seizures
  – Side effect profile
  – Dosing frequency
  – Economic considerations
Treatment Strategies 2.

- Educated trial and error process
- For the most part the medications have equal efficacy and are not studied against one another
- Start at low dose and gradually increase
- Start single medication and push to maximum tolerated dose
- Every person is different and therefore doses will be different
Treatment Strategies 3.

• If one medicine fails attempt a second monotherapy trial
• If second monotherapy trial fails attempt combination therapy
• When switching between medications titrate new medicine to “therapeutic” dose before weaning other medication
Drug Levels

- “TREAT THE PATIENT, NOT THE LEVEL”
- Adjust dose based on seizures and side effects
- Some exceptions
  - Document a low level
  - Document a level when patient is seizure free
  - Prior to a planned pregnancy
Part 2: Generic and Brand Name Medications
Older Antiepileptics in the U.S.

- Phenobarbital 1912
- Phenytoin (Dilantin) 1938
- Primidone (Mysoline) 1954
- Carbamazepine (Tegretol, Carbatrol) 1974
- Ethosuximide (Zarontin) 1960
- Valproate (Depakote) 1978
Newer Antiepileptics in the U.S.

- Felbamate (Felbatol) 1993
- Gabapentin (Neurontin) 1994
- Lamotrigine (Lamictal) 1995
- Topiramate (Topamax) 1996
- Tiagabine (Gabatril) 1997
- Oxcarbazepine (Trileptal) 1999
- Levetiracetam (Keppra) 2000
- Zonisamide (Zonegran) 2000
- Pregabalin (Lyrica) 2005
- Lacosamide (Vimpat) 2008
- Rufinamide (Banzel) 2008
- Vigabatrin (Sabril) 2009
Which Medicine for Which Seizure

- Phenytoin
- Carbamazepine
- Oxcarbazepine
- Phenobarbital
- Gabapentin
- Tiagabine
- Pregabalin

Focal Seizures
Phenobarbital

- All types of epilepsy
- Twice daily dosing
- Somnolence is most common side effect
- Long term use can cause osteopenia/osteoporosis
- Must be weaned very slowly
Phenytoin (Dilantin)

• All types of epilepsy
• Immediate release: three times daily
• Extended release: once daily
• Side effects: Dizziness, confusion, sedation, rash, N/V
• Long term side effects: osteoporosis, gingival hyperplasia, neuropathy, cerebellar degeneration
Carbamazepine (Tegretol)

- Focal seizures
- IR: 3-4 times daily
- ER: 2 times daily
- Side Effects: somnolence, dizziness, blurred vision
- Liver toxicity, osteoporosis
- Serious rash
Valproate (Depakote)

- Focal and generalized
- Depakote (DR): twice daily
- Depakote (ER): daily
- Side effects: somnolence, confusion, tremor, weight gain, hair loss
- Liver toxicity, pancreatitis, low platelets
Gabapentin (Neurontin)

- Focal seizures
- Three times daily with wide dosage range
- Side Effects: dizziness, somnolence, peripheral edema
Lamotrigine (Lamictal)

- Focal and generalized
- Twice daily with wide dosage range
- Side effects: somnolence, dizziness, double vision, nausea/vomiting
- RASH-call doctor if experience a rash
Topiramate (Topamax)

• Focal and Generalized
• Twice daily
• Side Effects: somnolence, weight loss, memory impairment, word finding difficulty
• Kidney stones
Oxcarbazepine (Trileptal)

- Focal seizures
- Twice daily
- Side effects: somnolence, dizziness, double vision
- Low Sodium
- Serious rash
Levetiracetam (Keppra)

- Focal and generalized
- Twice daily
- Can be started relatively quickly
- Side effects: somnolence, dizziness
- Mood disturbances
Pregabalin (Lyrica)

- Focal seizures
- Twice or three times daily
- Side effects: dizziness, weight gain, somnolence
Lacosamide (Vimpat)

- Focal seizures
- Twice daily
- Side effects: N/V, gait instability, dizziness
Vigabatrin (Sabril)

- Focal seizures
- Twice daily

- Side Effects: weight gain, N/V, somnolence or insomnia, urinary tract infections
- Vision loss (tunnel vision). Tends to occur after a few weeks-months of treatment and tends to be asymptomatic.
- Treatment response is evident within weeks to months
- SHARE program
Metabolism and Excretion

• Almost all antiepileptics are metabolized by the liver and excreted by the kidneys
• Exceptions: gabapentin, lacosamide
General Principles

• Baseline labs and lab monitoring
• Antiepileptics have many different drug interactions
• Make sure your doctor knows all the other medications you are taking
• Do not stop an antiepileptic without talking with your doctor
Questions?