

Current Epilepsy Management: Antiepileptic Medications to VNS

February 13, 2009

Delia R. Nickolaus MSN, CPNP-PC/AC
Pediatric Nurse Practitioner
Department of Neurology
Seattle Children's Hospital



Disclosures/ Conflict of Interest

- I have nothing to disclose
- I have no conflict of interests regarding this presentation

Delia Nickolaus, MSN, CPNP-PC/AC
Evidence Based Practice:
Update for Nurses



February 13, 2009

Objectives

- Recognize different types of seizures
- Understand rationale for using different antiepileptic medications to manage seizures
- Identify alternatives for treating seizures

Delia Nickolaus, MSN, CPNP-PC/AC
Evidence Based Practice:
Update for Nurses



February 13, 2009

What are Seizures?

- A sudden, episodic, involuntary alteration in consciousness, motor activity, behavior, sensation, or autonomic function due to abnormal discharges as evidenced by the EEG recording
- A convulsion is an involuntary muscular contraction and relaxation; the terms seizure and convulsions may be used synonymously
- Abnormal neuronal discharges can be due to infections, lesions, pressure, chemical imbalances, and medications

Delia Nickolaus, MSN, CPNP-PC/AC
Evidence Based Practice:
Update for Nurses



February 13, 2009

Are There Different Types of Seizures?

- YES! YES! YES!
- There are many different types of seizures
- A person may have only one type of seizure throughout life or may have a combination of different types of seizures
- The type(s) of seizures may change over the years
- A person with seizures may have one kind of seizure early on in life and then development another type of seizure later in life after having been seizure free
- Some seizure syndromes occur at certain ages and then resolve

Delia Nickolaus, MSN, CPNP-PC/AC
Evidence Based Practice:
Update for Nurses



February 13, 2009

What Are the Types of Seizures?

- Partial Seizures
 - Simple: able to respond to the environment during the seizure
 - Complex: unable to respond to the environment during the seizure
- These usually start in one particular area of the brain and may be called focal seizures
- Sometimes if a focal seizure is not stopped early enough, then it spreads to other areas of the brain or after starting as a focal seizure it may spread quickly to other areas of the brain (generalizing)

Delia Nickolaus, MSN, CPNP-PC/AC
Evidence Based Practice:
Update for Nurses



February 13, 2009

What Are the Types of Seizures? (cont'd)

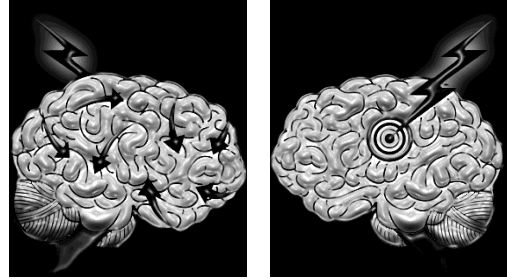
- Generalized Seizures
 - Convulsive: motor movements (tonic, clonic, myoclonic)
 - Nonconvulsive: movement arrest (absence)
- Status Epilepticus: a prolonged seizure lasting more than 5 to 10 minutes or several successive seizures without recovery between them lasting more than 30 minutes
- Febrile Seizures: occur around the time of a fever
 - Typically with a higher fever (>100.1 F or 37.8 C)
 - May occur with some GI illnesses
 - New reports identifying an association with the MMRV vaccine and febrile seizures

Delia Nickolaus, MSN, CPNP-PC/AC
Evidence Based Practice:
Update for Nurses



February 13, 2009

What Are the Types of Seizures? (cont'd)



Delia Nickolaus, MSN, CPNP-PC/AC
Evidence Based Practice:
Update for Nurses



February 13, 2009

How Are Seizures Treated?

- Identify the type of seizure
- Select an antiepileptic medication based on the type of seizure
- Take into account the child's age, ability to swallow pills, other chronic conditions: personalize the medication choice to the person
- Monitor how the person does on the medication
- Make changes as needed
 - Dose
 - Change to a new medication
 - Add another antiepileptic medication

Delia Nickolaus, MSN, CPNP-PC/AC
Evidence Based Practice:
Update for Nurses



February 13, 2009

Identify the Seizure

- History of what the seizure looks like
 - What body parts are moving?
 - What kind of movements? (clonic, tonic, myoclonic)
 - How long did the seizure last?
 - Level of consciousness during the seizure and was the person able to respond to questions or remember a special word?
 - Is there incontinence of bowel or bladder?
 - Are there specific triggers for the seizures?
 - How frequently do the seizures occur?
 - Are there pre-ictal events (auras) that indicate a seizure is coming?
 - What happens after the seizure? (confusion, sleepiness, coordination, motor function)

Delia Nickolaus, MSN, CPNP-PC/AC
Evidence Based Practice:
Update for Nurses



February 13, 2009

Personalizing the Medication Plan

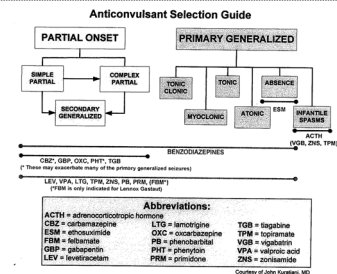
- Based on the history and hopefully an EEG, identify what type of seizures the person is having
 - Partial, Generalized
 - Infantile Spasms: hypsarythmia
 - Absence: 3 Hz spike waves
- There are many specific EEG patterns that help identify a particular epileptic syndrome
- Febrile seizures don't usually require a daily medication, but if the child has prolonged febrile seizures (greater than 3 minutes), then a rescue medication is needed

Delia Nickolaus, MSN, CPNP-PC/AC
Evidence Based Practice:
Update for Nurses



February 13, 2009

Personalizing the Medication Plan



Delia Nickolaus, MSN, CPNP-PC/AC
Evidence Based Practice:
Update for Nurses



February 13, 2009

Personalizing the Medication Plan (cont'd)

- Infantile Spasms
 - ACTH
 - Steroids
 - Vigabatrin
 - Zonisamide
- Absence Seizures
 - Generalized nonconvulsive seizures
 - Ethosuximide
 - Other antiepileptic medications for generalized seizures

Delia Nickolaus, MSN, CPNP-PC/AC
Evidence Based Practice:
Update for Nurses



February 13, 2009

Personalizing the Medication Plan (cont'd)

- Partial Seizures
 - Tegretol (carbamazepine)
 - Avoid grapefruit juice: increases bioavailability of the drug
 - May alter electrolytes; especially sodium
 - May alter CBC, especially platelets
 - Liver concerns
 - Trileptal (oxcarbazepine)
 - May alter electrolytes; especially sodium
 - May alter CBC, especially platelets
 - Liver concerns
 - Similar to Carbamazepine

Delia Nickolaus, MSN, CPNP-PC/AC
Evidence Based Practice:
Update for Nurses



February 13, 2009

Personalizing the Medication Plan (cont'd)

- Generalized Seizures
 - Depakote (Depakene, valproic acid)
 - Liver enzymes inducer
 - Interferes/Interacts with many other medications
 - Dilantin (phenytoin, fosphenytoin)
 - Gingival Hyperplasia; Rash
 - Fosphenytoin can be given IV rapidly
 - Keppra (levetiracetam)
 - Behavior issues, especially if they were present before starting this medication
 - Phenobarbital
 - Most frequently given to children under 2 years of age
 - Hypotension; Drowsiness

Delia Nickolaus, MSN, CPNP-PC/AC
Evidence Based Practice:
Update for Nurses



February 13, 2009

Personalizing the Medication Plan (cont'd)

- Generalized Seizures
 - Lamictal (lamotrigine)
 - Rash if titrated up too quickly
 - Least likely to cause cognitive concerns
 - Neurontin (gabapentin)
 - Sedation
 - Topamax (topiramate)
 - Cognitive issues
 - Zonegran (zonisamide)
 - Anorexia
 - Kidney stones

Delia Nickolaus, MSN, CPNP-PC/AC
Evidence Based Practice:
Update for Nurses



February 13, 2009

Rescue Medication Plan

- What is a rescue medication?
 - Diastat: Valium in gel formulation for rectal use
 - Ativan (lorazepam): oral or IV
 - Versed (midazolam): oral, buccal, or IV
- Why give a rescue medication?
 - Early intervention at 3-5 minutes with a rescue medication is very important
 - Seizures that continue for longer than 3-5 minutes may lead to status epilepticus, which is much harder to treat

Delia Nickolaus, MSN, CPNP-PC/AC
Evidence Based Practice:
Update for Nurses



February 13, 2009

Rescue Medication Plan (cont'd)

- Who needs a rescue medication?
 - Recommended for those people who are prone to prolonged seizures
 - For those with clusters of seizures
 - For those people who have very infrequent seizures and no daily medication

Delia Nickolaus, MSN, CPNP-PC/AC
Evidence Based Practice:
Update for Nurses



February 13, 2009

Medication Formulations

- **IV:** Phosphenytoin, Phenobarbital, Keppra, Valproic Acid
- **Liquid:** Phenobarbital, Keppra, Tegretol, Trileptal, Epicene, Neurontin, Dilantin, Ethosuximide
- **Sprinkle Capsules:** Topamax, Depakote, Zonegran (pseudo-sprinkles)
- **Quick Dissolve/Chewable:** Lamictal, Tegretol, Phenytoin

Delia Nickolaus, MSN, CPNP-PC/AC
Evidence Based Practice:
Update for Nurses



February 13, 2009

Monitoring the Medications

- Labs
 - CBC, Liver Function, Na, K, BUN, Cr, Glucose, Cl, CO2
 - Drug Levels
- Assess the impact of the medication on the seizures
- Assess the impact of any side effects
- Assess the compliance with the medication regimen
 - Dosing frequency (Daily, BID, TID)
 - Route (liquid, sprinkles, tablets)

Delia Nickolaus, MSN, CPNP-PC/AC
Evidence Based Practice:
Update for Nurses



February 13, 2009

Monitoring: When to Make Changes?

- Changes in weight (normal growth) may increase seizures, therefore the medication may need to be increased (mg/kg, levels)
- Levels are good, dose is good: no improvement in seizures
- Intolerable side effects
 - Elevated liver enzymes
 - Changes in the CBC
 - Behavioral Issues
 - Cognitive Issues

Delia Nickolaus, MSN, CPNP-PC/AC
Evidence Based Practice:
Update for Nurses



February 13, 2009

Medications Not Working: Next?

- 50-60% of people with seizures will respond to the first medication (numbers vary based on source)
- If a person "fails" at least 3 medications, then surgery is may be considered (may depend on who is managing)
- Alternatives to Medications
 - Ketogenic Diet
 - Diet high in fat, low in carbohydrates and protein to promote ketosis
 - Surgery
 - Resective surgery
 - Vagus Nerve Stimulator

Delia Nickolaus, MSN, CPNP-PC/AC
Evidence Based Practice:
Update for Nurses



February 13, 2009

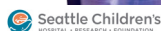
Vagus Nerve Stimulator (VNS)

What is it?

Consists of a pulse generator and vagus nerve leads



Delia Nickolaus, MSN, CPNP-PC/AC
Evidence Based Practice:
Update for Nurses



February 13, 2009

Vagus Nerve Stimulator

How does it work?

- Don't really know exactly how it works
- Electrical impulses are generated at specific strengths and intervals
- It is thought that through these electrical impulses that the neurotransmitter levels in the brain are affected and therefore decrease the seizure activity
- It may take a while to see an effect
- Only about 50 % of patients with a VNS see results

Delia Nickolaus, MSN, CPNP-PC/AC
Evidence Based Practice:
Update for Nurses



February 13, 2009

Vagus Nerve Stimulator

How do you use the VNS?

- Depending on the settings determined by their Neurology Provider, the device will send impulses every 1.1 to every 5 minutes (sometimes more frequently)
- The intensity of the impulse is programmed specifically for each patient
- These settings can only be changed by their Neurology Provider
- Additionally, a special magnet can be used to provide a stronger and longer impulse in the event of a seizure

Delia Nickolaus, MSN, CPNP-PC/AC
Evidence Based Practice:
Update for Nurses



February 13, 2009

Vagus Nerve Stimulator



How is it programmed?

A Neurology provider uses a special programming wand with a handheld computer to prescribe and program the appropriate settings transcutaneously

Delia Nickolaus, MSN, CPNP-PC/AC
Evidence Based Practice:
Update for Nurses



February 13, 2009

Vagus Nerve Stimulator

What about the magnet for the VNS?

- Swiping a special VNS magnet over the pulse generator device will activate an impulse that is stronger and longer than usual impulses. The specifics of the setting are determined by the Neurology provider.



Delia Nickolaus, MSN, CPNP-PC/AC
Evidence Based Practice:
Update for Nurses



February 13, 2009

Vagus Nerve Stimulator

When is the magnet used?

- The magnet is used when a person with a VNS has an aura of their seizure or at the beginning of their seizure
- It can be repeated every 2 minutes based on the recommendation of the Neurology provider
- Occasionally it may be used after a seizure to decrease the postictal time
- Maximum number of swipes is usually 5 times every 15 minutes

Delia Nickolaus, MSN, CPNP-PC/AC
Evidence Based Practice:
Update for Nurses



February 13, 2009

Vagus Nerve Stimulator

How is the magnet used?

- By swiping the magnet over the left shoulder area and counting "one one-thousand, two one-thousand, three one-thousand" (SCH protocol)
- Generator must sense the magnet for at least one second, but less than 65 seconds for a magnet activation
- May repeat every 2 minutes until seizure stops or up to 5 times total
- May be helpful to palpate area and identify edges of pulse generator before swiping or before the need to swipe

Delia Nickolaus, MSN, CPNP-PC/AC
Evidence Based Practice:
Update for Nurses



February 13, 2009

Vagus Nerve Stimulator

What does the magnet actually do?

- When the magnet is swiped over the device, it tells the pulse generator to deliver a stronger and longer pulse of current when the magnet is pulled away
- After the stronger and longer pulse, the device returns to normal functioning
- If the magnet does not come into contact with the device, it will not send a pulse
- If the magnet is over the device longer than 65 seconds, all stimulation is suspended
- Once the magnet is removed, the generator returns to normal functioning immediately

Delia Nickolaus, MSN, CPNP-PC/AC
Evidence Based Practice:
Update for Nurses



February 13, 2009

Vagus Nerve Stimulator

VNS Precautions

- MRI
- Surgery with electrocautery
- Diathermy: therapeutic ultrasound

Magnet Precautions

- Credit Cards
- Cell phones
- Computers



Delia Nickolaus, MSN, CPNP-PC/AC
Evidence Based Practice:
Update for Nurses



February 13, 2009

Vagus Nerve Stimulator

Where can I find more information?

The Cyberonics website has a patient handbook that can be printed out or just read online

www.vnstherapy.com

Delia Nickolaus, MSN, CPNP-PC/AC
Evidence Based Practice:
Update for Nurses



February 13, 2009



Thanks!

