Strengthen & Enhance Epilepsy Knowledge (SEEK) Training

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NATIONAL COORDINATING CENTER *for* EPILEPSY

American Academy of Pediatrics

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Seizure Rescue Medications and Seizure Action Plans

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Disclosures

- We have no relevant financial relationships with the manufacturer(s) of any commercial product(s) and/or provider of commercial services discussed in this activity.

- This program will address some medications that are used off-label as rescue therapies.

Objectives

- Define potential and actual seizure emergencies.
- Understand the indications for and use of seizure rescue medications and common side effects.
- Discuss how to help patients and families create a seizure action plan and address disclosure issues.

Epilepsy Background

- There are approximately 13.5 million children and youth with special health care needs (CYSHCN) in the United States.[1]
  - Included among the CYSHCN are 470,000 children aged birth to 18 years living with epilepsy, the most common childhood neurologic condition in the US.[2]
- Epilepsy is a neurologic disorder where a person has recurring seizures.[3]
  - Seizures are sudden events that cause temporary changes in physical movement, sensation, behavior, or consciousness.
  - Seizures are caused by abnormal electrical and chemical changes in the brain.

Epilepsy Background

- Epilepsy is a condition that requires complex, coordinated systems of primary and specialty care.[4]
  - A lack of awareness of the treatment options by providers can significantly affect a patient's quality of life.[5]
  - However, only roughly one-third of children with epilepsy have access to comprehensive health care.[6]
  - Nationally, the number of pediatric neurologists is at least 20% below the need, resulting in limited access to care for CYE, especially in rural and medically underserved areas/populations (MUA/Ps).[4,7]
  - Approximately 20% of Americans live in rural areas, while only 9% of the nation's physicians practice in these areas.[4]

Epilepsy Background References

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Seizure Rescue Medications

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Case Scenarios

- A 6-year-old girl with Lennox Gastaut syndrome (multiple daily seizures and intellectual disability) has a 10-minute seizure at school once per week for which an ambulance is called and she is taken to the emergency room (ER).
- A 12-month-old boy has a cluster of febrile seizures when sick. Currently, his parents are uninsured and have concerns about being able to afford proper care and medications.
- A 15-year-old girl with focal seizures wants to go to her friend's house for a sleepover but has had prolonged seizures in the past and her parents don't feel it's safe.

Why Would a Seizure Require Rescue?

- Most seizures last 2 minutes and resolve spontaneously, often without intervention.
  - When a seizure lasts a long time or occurs close together and the person doesn't recover between seizures it then becomes a seizure emergency.
- Definition of **status epilepticus** is a seizure with 5 minutes or more of continuous clinical and/or electrographic seizure activity or recurrent seizure activity without recovery between seizures (Neurocritical Care Society 2012 Guidelines).
  - Can be convulsive or non-convulsive depending on the physical correlate.
- Why is status epilepticus a problem?
  - Seizures become self-perpetuating and pharmacoresistant the longer they continue.
  - Direct neuronal damage: Animal studies show histopathological changes after 15-30 minutes of a seizure.
  - Increased metabolic demand: After 30-60 minutes of a seizure the metabolic compensatory mechanisms fail leading to organ failure.

Sources: Sirven JI, Shafer PO, Schachter SC. Seizure Emergencies. Epilepsy.com. Updated on February 05, 2014. Accessed August 25, 2022. https://www.epilepsy.com/complications-risks/emergencies.
Brophy GM, Bell R, Claassen J, et al. Guidelines for the evaluation and management of status epilepticus. *Neurocrit Care*. 2012;17(1):3-23. doi:10.1007/s12028-012-9695-z

Seizure Rescue Medications - Indications

- Prolonged seizures (> 5 minutes).
- Clusters of seizures have variable definitions (eg, > 2/24 hours, > 3/hours) and likely depends on the patient's baseline seizure frequency.
  - Also called acute repetitive seizures.
- Catamenial epilepsy are seizures associated with the menstrual cycle.
- Seizure rescue medications at home or at school can prevent progression to status epilepticus as well as EMS/ER visits.

Seizure Rescue Medications – Routes of Administration

- Rectal
  - Diazepam is FDA approved for adults and children > 2 years old (though used as young as 6 months), weight-based dosing, $300-400 per kit.
- Intranasal
  - Diazepam is FDA approved for adults and children > 6 years old, weight-based dosing, >$500 per box.
  - Midazolam is FDA approved for adults and children > 12 years old, flat 5mg dose, >$500 per box.
- Oral/Buccal
  - Clonazepam is not FDA approved for seizure rescue, available as oral dissolving tablet, has poor dosing guidelines, can use as a scheduled bridge to provide additional protection from breakthrough seizures during acute illness or while titrating a new medication, <$1/pill.
- Device-based
  - Vagal nerve stimulator is not FDA approved for seizure rescue.

Dosing Seizure Rescue Medications

- **Rectal Diazepam Gel and Intranasal Diazepam (> 6 years):**
  - <2 years: off-label use of the rectal gel in infants > 6 months.
  - 2-5 years: 0.5 mg/kg.
  - 6-11 years: 0.3 mg/kg.
  - ≥ 12 years: 0.2 mg/kg.
- **Intranasal Midazolam:**
  - 5 mg once. Option to repeat 5 mg once.
- **Oral/Buccal Clonazepam:**
  - < 40 kg: 1 mg.
  - > 40 kg: 2 mg.

Benzodiazepines – Adverse Effects

- Central nervous system depression, sedation, lethargy, ataxia, respiratory depression, or cognitive impairment.
  - Risk for respiratory depression is lower in children than adults.
  - Seizures and status epilepticus itself causes respiratory depression.
- Nasal discomfort and epistaxis can be seen with intranasal benzodiazepine administration.
- Tolerance, dependence, and withdrawal are risks with chronic use.
- Boxed warning against accompanying use of benzodiazepines and opioids due to risk for respiratory depression and dependence.
- Contraindicated in acute narrow-angle glaucoma.
- Oral clonazepam induces hypersalivation, don't use for convulsive seizures.

Vagal Nerve Stimulation (VNS)

- Approved by FDA as an add-on therapy for adults and children > 4 years for refractory epilepsy.
- A generator is implanted under the skin on the left chest and is attached to a wire wound around the vagus nerve in the neck to deliver pulse stimulation at regular intervals.
- If a seizure occurs, the patient or caregiver can swipe a magnet over the generator to send an extra burst of stimulation which may help abort the seizure in ~30% (Fisher et al. *Acta Neurol Scand* 2015: 131: 1–8).
- Newer devices have an autostimulation feature that detects increases in heart rate associated with seizures and delivers an additional stimulation which may help abort ~20% of seizures.

Seizure Action Plans

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What is a Seizure Action Plan?

- A Seizure Action (or Response) Plan (SAP) is a written plan created by the patient and/or caregivers and physician to list out steps to treat seizures in the outpatient setting.
  - Consider lifestyle of the child (ie, extracurriculars, friends, sports, etc).
- A seizure plan is often required by schools and medical facilities.
  - Parents typically provide the school with the SAP and rescue medication (s).
- Many prefabricated forms are available online:
  - Epilepsy Foundation: https://www.epilepsy.com/preparedness-safety/action-plans.
- Components: Seizures types and frequencies, seizure first aid, emergency contact information, rescue medication instructions, and other precautions.

Source: Sirven JI, Shafer PO, Schachter SC. Seizure Action Plans. Epilepsy.com. Updated on April 14, 2020. Accessed August 25, 2022. https://www.epilepsy.com/preparedness-safety/action-plans.

SEIZURE ACTION PLAN (SAP)

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Name: _____ Birth Date: _____

Address: _____ Phone: _____

Emergency Contact/Relationship _____ Phone: _____

Seizure Information

Seizure Type	How Long It Lasts	How Often	What Happens

How to respond to a seizure (check all that apply)

- ☐ First aid – **Stay. Safe. Side.**
- ☐ Give rescue therapy according to SAP
- ☐ Notify emergency contact
- ☐ Notify emergency contact at _____
- ☐ Call 911 for transport to _____
- ☐ Other _____

First aid for any seizure

- ☐ **STAY** calm, keep calm, **begin timing seizure**
- ☐ Keep me **SAFE** – remove harmful objects, don't restrain, protect head
- ☐ **SIDE** – turn on side if not awake, keep airway clear, don't put objects in mouth
- ☐ **STAY** until recovered from seizure
- ☐ Swipe magnet for VNS
- ☐ Write down what happens _____
- ☐ Other _____

When to call 911

- ☐ Seizure with loss of consciousness longer than 5 minutes, not responding to rescue med if available
- ☐ Repeated seizures longer than 10 minutes, no recovery between them, not responding to rescue med if available
- ☐ Difficulty breathing after seizure
- ☐ Serious injury occurs or suspected, seizure in water

When to call your provider first

- ☐ Change in seizure type, number or pattern
- ☐ Person does not return to usual behavior (i.e., confused for a long period)
- ☐ First time seizure that stops on its' own
- ☐ Other medical problems or pregnancy need to be checked

When **rescue therapy** may be needed:

WHEN AND WHAT TO DO

If seizure (cluster, # or length) _____
Name of Med/Rx _____ How much to give (dose) _____
How to give _____

If seizure (cluster, # or length) _____
Name of Med/Rx _____ How much to give (dose) _____
How to give _____

If seizure (cluster, # or length) _____
Name of Med/Rx _____ How much to give (dose) _____
How to give _____

Care after seizure

What type of help is needed? (describe) _____

When is person able to resume usual activity? _____

Special instructions

First Responders: _____

Emergency Department: _____

Daily seizure medicine

Medicine Name	Total Daily Amount	Amount of Tab/Liquid	How Taken (time of each dose and how much)

Other information

Triggers: _____

Important Medical History _____

Allergies _____

Epilepsy Surgery (type, date, side effects) _____

Device: ☐ VNS ☐ RNS ☐ DBS Date Implanted _____

Diet Therapy ☐ Ketogenic ☐ Low Glycemic ☐ Modified Atkins ☐ Other (describe) _____

Special Instructions: _____

Health care contacts

Epilepsy Provider: _____ Phone: _____

Primary Care: _____ Phone: _____

Preferred Hospital: _____ Phone: _____

Pharmacy: _____ Phone: _____

My signature _____ Date _____

Provider signature _____ Date _____

Epilepsy.com

Revised 01/2020 130SRP/PAB1216

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Source: Sirven JI, Shafer PO, Schachter SC. Seizure Action Plans. Epilepsy.com. Updated on April 14, 2020. Accessed August 25, 2022. https://www.epilepsy.com/preparedness-safety/action-plans.

Seizure Action Plan-Disclosure Issues

- Epilepsy remains stigmatized and misunderstood, though this is changing.
  - Disclosure of an epilepsy diagnosis is patient-specific balancing safety and privacy concerns. This usually aligns with who is provided the SAP.
  - Schools may impose restrictions despite ADA protections.
  - Teenagers may not want to confide in friends.
  - Usually helpful for college roommates to know.
  - Motor vehicle administration MUST know about seizures.
- Establishing a school seizure action plan often requires diagnosis disclosure.
  - Different schools or individuals may have different levels of comfort with administering seizure rescue medications.
  - When in doubt, nonmedical caregivers (eg, bus driver, parents of friends, etc) may just need to call 911.

Considerations from Lived Experience

- Prescribing intranasal or oral formulations instead of rectal formulations.
  - Usually preferred by CYE to prevent embarrassment unless necessary.
- Diagnosis disclosure – elementary/high school vs. college.
  - Increased perception of judgment/stigma in high school/lower school.
  - College environment is more laid-back with less everyday exposure to the same peers (beside roommates).
- Prevent non-patient rescue medication abuse.
- Self-consciousness due to VNS stimulation – possible noise.

Summary

- Seizures lasting longer than 5 minutes are a medical emergency and should be treated as quickly as possible.
- Seizure rescue medications for out of hospital use are available in rectal, intranasal, and oral formulations.
- Every child with epilepsy should have a seizure action plan to let caregivers know how to treat a seizure at home or in school.

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AAP Resources

- National Coordinating Center for Epilepsy
  - National Coordinating Center for Epilepsy – Treating Pediatric Epilepsy
    - While there is no one definitive treatment or cure for pediatric epilepsy, there are medicines and other treatment options that can help keep seizures under control. Finding the right treatment plan can help children and youth with epilepsy (CYE) thrive.
  - National Coordinating Center for Epilepsy – Seizure Action Plan
    - Epilepsy is best managed through preparation, treatment and teamwork. An accurate epilepsy diagnosis and an appropriate treatment plan are necessary for successful epilepsy management. The goal of epilepsy management is to control/reduce seizures without producing unwanted medication side effects.

Questions?

If you have any questions regarding the presentation, please feel free to contact The National Coordinating Center for Epilepsy (epilepsy@aap.org).