

Texas Children's Center for TeleHealth  
Nursing and Allied Health Professionals Distance Education and CNE/CEU Offering presents  
"Emergency Management of Seizures in the School Setting"  
Tuesday, January 13, 2009

**Notice of Requirements for Successful Completion**

In order to receive 1.0 CNE contact hours for this activity, you must attend the entire presentation and complete a participation evaluation form.

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**Emergency Management of Seizures in the School Setting**

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**Purpose**

- To provide information that will enable you to more effectively manage seizures in the school setting

**Objectives**

- At the end of this session you will be able to:
  - Define epilepsy and differentiate among common seizure types
  - Define the concepts intractability and status epilepticus
  - Identify the four most common treatment options

**Objectives**

- Provide appropriate first aid for a student during and after a seizure
- Identify when a seizure is an emergency and respond appropriately
- Identify components of a seizure action plan

1 CNE contact hour available to Nurses and 1 CEU for Social Workers, Licensed Professional counselors

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## Seizures and Epilepsy Overview

### What is a Seizure?

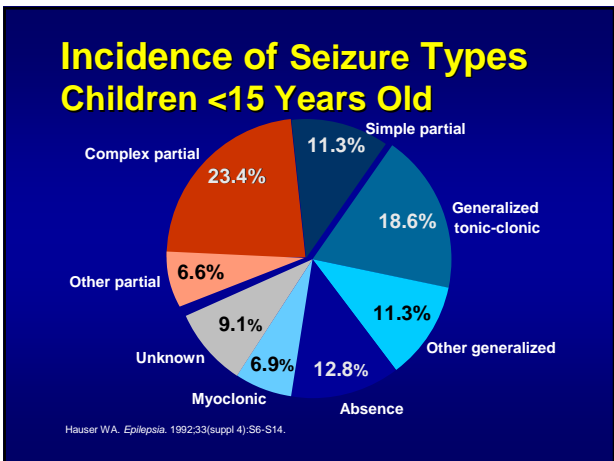
- Sudden, involuntary, time-limited alteration in cerebral function due to abnormal neuronal discharges manifested by stereotyped alterations in awareness, behavior, movements, or sensations.

### What is Epilepsy

- Disorder characterized by recurrent, usually unprovoked seizures.
  - Recurrent = 2 or more seizures
- Seizures occur spontaneously and unpredictably

### Epilepsy is Common

- 1 out of 10 people will have a seizure in their lifetime
- 1 out of 100 people will develop epilepsy
- 2.7 million people overall in the US
- 315,000 students in the US
- More than 45,000 new cases each year in children
- Epilepsy is more common than Cerebral Palsy, Parkinson's Disease, and Multiple Sclerosis combined



### Cause of Epilepsy

- Cryptogenic
  - Unknown
- Idiopathic
  - Greek *idio* meaning "self" and *pathy* meaning "suffering"
  - Arises from itself--genetic
  - CNS functioning is normal

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## Causes of Epilepsy

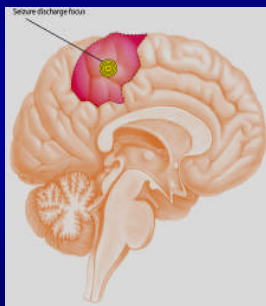
- **Symptomatic**
  - Brain trauma
  - Brain lesions
  - Poisoning
  - Infections of the brain
  - Brain injury at birth
  - Abnormal brain development

## Types of Seizures

- **Based on consciousness**
  - Lose consciousness—Generalized
  - Don't lose consciousness—Partial
    - Normal consciousness—Simple partial
    - Altered consciousness—Complex partial

ILAE, 1981

## Partial-Onset Seizures



- **Involve only part of the brain**
  - Simple partial
  - Complex partial
  - Secondary generalized

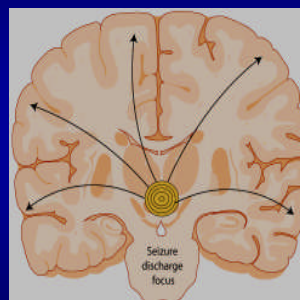
## Simple Partial Seizures

- **No loss of consciousness**
- **Lasts seconds to minutes**
- **With motor symptoms: isolated twitching of arms, face, legs**
- **With somatosensory symptoms: tingling, sounds, smells, feeling of upset stomach**
- **With autonomic symptoms: pupillary changes**
- **With psychic symptoms: déjà vu, fear**

## Complex Partial Seizures

- **May start with an aura**
- **Impairment of consciousness**
- **Often begins with a blank dazed stare**
- **Frequently associated with automatisms**
  - Repetitive purposeless movements
- **Post-ictal confusion, drowsiness, headache**
- **Duration 1-3 minutes**

## Generalized Seizures



- **Involve the whole brain**
  - Tonic-clonic
  - Tonic
  - Clonic
  - Absence
  - Myoclonic
  - Atonic

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### Generalized Tonic-Clonic

- Sudden, hoarse cry
- Loss of consciousness
- Tonic phase: tonic posturing
- Clonic phase: repetitive jerking
- May have shallow breathing and drooling
- Post-ictal confusion, sleep, headache
- Duration 2-5 minutes

### Absence Seizure

- Brief (<10 sec, rarely >45 sec)
- Cessation of activity with blank stare
- May be accompanied by chewing or blinking
- May occur many times a day
  - May occur in clusters
- May be confused with:
  - Daydreaming
  - ADHD
  - Lack of attention

### Myoclonic Seizure

- Brief, involuntary jerk of arms (most common) or legs
- Multiple seizures/day

### Atonic Seizure

- Sudden loss of tone
  - Head drop
  - Collapse and fall
- High risk for injury
  - Wear protective helmet

### What precipitates/triggers seizures?

- Missed or late medication (#1 reason)
- Illness
- Stress/anxiety
- Lack of sleep
- Hormonal changes
- Overheating/overexertion
- Poor diet/missed meals
- Drug interactions
- Alcohol or drug use

### Other Triggers

- Flashing lights in movies, computers, and television
- Many times no trigger is identified
  - Seizures are unpredictable

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### Intractable Epilepsy

- Fail to respond to standard antiepileptic drug therapy or other treatment modalities
- Intolerable adverse effects

### Status Epilepticus

- Medically defined as 30 minutes of uninterrupted seizure activity and may include:
  - one prolonged seizure or
  - multiple seizures without recovery to baseline
- "Medical emergency"
  - requires immediate action to stop the seizure activity
- Seizure Action Plan
  - defines what constitutes a seizure emergency
  - detailed emergency response plan

### Treatment Options



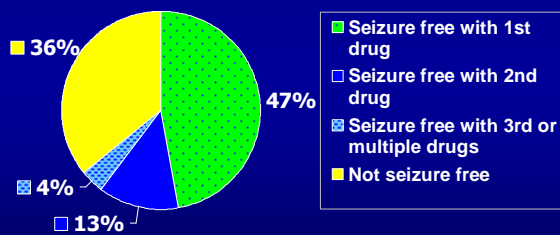
- Anti-epileptic Medications
- Ketogenic Diet
- Vagus Nerve Stimulator
- Epilepsy surgery

### Choices of AEDs

- |                       |                      |
|-----------------------|----------------------|
| ■ Old (prior to 1993) | ■ New (1993-present) |
| – Phenobarb           | – Felbamate          |
| – Phenytoin           | – Gabapentin         |
| – Mysoline            | – Lamotrigine        |
| – Valproate           | – Levetiracetam      |
| – Carbamazepine       | – Oxcarbazepine      |
| – Ethosuximide        | – Tiagabine          |
| – Clonazepam          | – Topiramate         |
| – Clorazepate         | – Zonisamide         |
|                       | – Rufinamide         |

### Success With Antiepileptic Drug (AED) Regimens

Previously Untreated Epilepsy Patients (N=470)



Kwan P, Brodie MJ. *N Engl J Med.* 2000;342(5):314-319.

### Side Effects of AEDs

- Can be unpredictable
  - Some are dose dependent
  - Others occur regardless of dose
- Newer medications generally have fewer cognitive side effects
- Long term effects are unclear
- Behavior and mood changes from AEDs are:
  - often difficult to sort out
  - not necessarily dose-related

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### Common AED Side Effects

- |  |   |
|--|---|
| <p><b>Dose-related/toxic:</b></p> <ul style="list-style-type: none"> <li>■ Diplopia, blurry vision</li> <li>■ Dizziness, lightheadedness</li> <li>■ Sedation</li> <li>■ Slowed thinking</li> <li>■ Feels drunk</li> <li>■ Coordination problems</li> <li>■ Unsteady walking</li> </ul> | <p><b>Drug-related:</b></p> <ul style="list-style-type: none"> <li>■ Cognitive problems</li> <li>■ Fatigue</li> <li>■ Weight gain or loss</li> <li>■ Cosmetic – acne, excessive hairiness or hair loss</li> <li>■ Hyperactivity, slowed movements</li> <li>■ Personality changes</li> <li>■ Mood changes, depression</li> </ul> |
|--|---|

### Drug Reaction Warning Signs

- Rash
- Prolonged fever
- Severe sore throat
- Mouth ulcers
- Easy bruising
- Weakness
- Excessive fatigue
- Swollen glands
- Lack of appetite
- Increased seizures

**Contact  
 Child's  
 Healthcare  
 Provider!**

*THESE ARE SERIOUS BUT NOT COMMON!*

### PRN Medications for Seizures

- Medications used for clusters of seizures or status epilepticus
  - Diazepam rectal gel
  - Lorazepam
  - Clonazepam

### Use of PRN Medications

- Diazepam Rectal Gel
  - Dose
  - When to give
  - Repeat dose?
- Lorazepam orally disintegrating tablet
- Clonazepam orally disintegrating tablet

### Diazepam Rectal Gel Administration

- Approved by the FDA
  - for treatment of prolonged and clusters of seizures
  - for use by family members and other non-medical caregivers
- Respiratory depression is NOT a common side effect

### Diazepam Rectal Gel Administration

- School districts may have specific regulations regarding administration
- School regulations and impact on the student must be discussed with parents
- Free video on the administration of diazepam rectal gel:  
[www.diastat.com](http://www.diastat.com)

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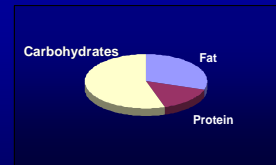
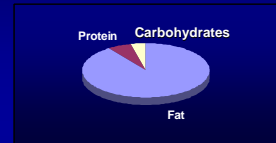
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### Ketogenic Diet

- Originally developed in 1920
- Designed to mimic biochemical changes associated with starvation
- Effective for all seizure types
- Compliance may be problematic
- Sudden loss of ketosis can cause increased seizures; possible status epilepticus

### Ketogenic Diet

- Produces state of ketosis
  - Severely restricting Carbohydrates
  - High fat, adequate protein
  - Forces liver to produce ketones
  - Brain utilizes ketones in place of glucose for energy



### Ketogenic Diet

- Challenges for school nurse
  - Must only receive ketogenic diet foods/formula/liquids
  - Must receive specified amount of fluid
  - NO cheating!
  - Medications with very low CHO content
    - Avoid elixir's, suspension

### Vagus Nerve Stimulation (VNS)

- A programmable pulse generator implanted subcutaneously in upper left chest
- Electrode wrapped around the left vagus nerve
- Exact mechanism of action not known
- Side effects may include hoarseness, coughing and shortness of breath and occur during stimulation only



### Use of VNS Magnet

- May be worn on wrist or belt
- Hold/swipe magnet over the VNS generator 1-2 seconds to activate it
  - Help abort or shorten the seizure duration
- Wait one minute between swipes
- Free video and more information
  - [www.vnstherapy.com](http://www.vnstherapy.com)

### Epilepsy Surgery

- Considered after failing AED therapy
- Inpatient video/EEG monitoring
- Other tests may include: MRI, SPECT scan, PET scan, and neuropsychological testing
- Procedures include:
  - focal resection, temporal lobectomy, lesionectomy, hemispherectomy and corpus callosotomy
- Post-surgical seizure-free rates vary
- Typically discharge home after 3-4 days
- Typically return to school after several weeks

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## Seizure First Aid

### Seizure First Aid

- Most seizures are NOT emergencies
- First aid varies depending upon:
  - No change in consciousness
  - Altered awareness
  - Loss of consciousness

### No Loss of Consciousness (Simple Partial Seizures)

- Stay calm
- Time seizure
- Reassure student that he or she is safe
- Protect student's privacy

### Altered Awareness (Complex Partial Seizures)

- Speak softly and calmly
- Guide away from potentially harmful objects
- Allow for wandering in a contained area
- If lasts 5 minutes beyond what is routine for that student or another seizure begins before full awareness is regained, follow student's seizure action plan
- **DO NOT** restrain or grab
- **DO NOT** shout or expect to follow verbal instructions

### Loss of Consciousness (Generalized Seizures)

- Protect from potentially harmful objects
- Observe and time seizure
- Ensure airway is open
- Cushion and protect head
- Turn student on one side
- Remain with student until fully conscious
- Follow the student's Seizure Action Plan
- **DO NOT** put anything in mouth
- **DO NOT** restrain

### Tonic-Clonic Seizure in Wheelchair

- Do not remove from wheelchair unless absolutely necessary
- Secure wheelchair to prevent movement
- Fasten seatbelt (loosely) to prevent from falling from wheelchair
- Protect and support head
- Ensure airway is open
- Pad wheelchair to prevent injuries to limbs

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### Tonic-Clonic Seizure in Water

- Support head so that both the mouth and nose are above the water
- Remove from the water as soon as it can be done safely
- Begin rescue breathing if not breathing
- Always transport to the emergency room even if student appears fully recovered

### Tonic-Clonic Seizure on School Bus

- Safely pull over and stop bus
- Position on one side across seat facing away from the seat back (or in the aisle if necessary)
- Follow seizure first aid protocol until the seizure stops and student regains consciousness
- Continue to the destination or follow school policy

### When is a Seizure an Emergency?

- First time seizure
- Convulsive seizure lasting more than 5 minutes
- Repeated seizures without regaining consciousness
- Student has diabetes or is pregnant
- Seizure occurs in water
- Injury occurs

### Seizure Action Plan

- Developed in conjunction with health care provider and parent
- Includes
  - Seizure types
  - Treatment
    - AEDs
    - Ketogenic Diet
    - Vagus Nerve Stimulation
      - Use of magnet
  - Emergency Response

### Seizure Action Plan

- Emergency Response
  - Diastat
    - Dose
    - When to give
    - Repeat dose?
  - Call 911
  - Call parent

### Seizure Action Plan

- Reviewed/updated annually
- Consider transportation issues
- Communication method
  - Parents
  - Health care provider

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**February 10, 2009 (Tuesday)**  
**4:30 – 5:30 PM**

**Immunizations**

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Or call the TeleHealth Hotline at:  
832-824-1127 or 1-800-TCH-TELE

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