Seizures, Submersion and Special Needs
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NWC EMSS CE
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Objectives... boy, do you have a lot to know!

Seizures:
- Simplifying the process through new categorization
- What are you actually seeing
- When and how should this patient be treated

Submersion:
- Walk through the basics
- When and how should this patient be treated

Special Needs:
- Technology seen in the pre-hospital setting
- Trust the caregiver
- How should EMS approach caring for patient throughout transport

Let's start here...
A new way of looking at an old issue

Definition
"a transient occurrence of S&S due to abnormal excessive or synchronous neuronal activity in the brain."

10 bizarre methods of treatment
Old Term vs New

- Absence – Generalized absence
- Atonic or drop attack – Focal or generalized atonic
- Grand mal – Generalized
- Infantile spasms – Focal
- Myoclonic – Focal or generalized myoclonic
- Petit mal – Generalized absence

- Tonic clonic – Generalized Tonic or drop attack – Focal or generalized
- Complex partial – Focal
- Focal motor – Focal motor
- Focal sensory – Focal sensory Limbic – Focal impaired awareness
- Psychomotor – Focal impaired awareness
- Simple partial – Focal aware

The New Basic Classification

The basic classification is a simple version of the major categories of seizures. The new basic seizure classification is based on 3 key features.

- Where seizures begin in the brain
- Level of awareness during a seizure
- Other features of seizures

CAUSES:

~70% cases = unknown
Remaining 30%, the following are most frequent:

- Brain tumor, stroke, and Alzheimer’s disease
- Heredity
  - One parent ~ 6% chance
  - Risk > when mother has it

PREVALENCE:

- Epilepsy is the 4th most common neuro disorder in US after Alzheimer’s, stroke & migraine
- Greater prevalence than CP, MS & Parkinson’s combined.
- Nearly 3M people (1% of US pop have some form of epilepsy. Nearly 4% (1 in 26) will develop epilepsy at some point in their lives.

INCIDENCE:

About 150,000 new cases are diagnosed each year in the United States

LONG - TERM TREATMENT

Achieves full/partial control in ~ 75% of cases

- Medication – The major form of tx is drug therapy – >20 antiepileptic drugs are currently in use – multiple-drug therapy is sometimes necessary
- Surgery – takes place when tissue causing sz is confined to a small area
- Ketogenic Diet – MD-prescribed, ↑ fat, ↓ carb, ↓ cal diet – (success in some childhood cases when standard tx fails)
- Vagus Nerve Stimulator – implanted device periodically stimulates brain through vagus nerve & can reduce seizures in some pts.
Defining where Seizures begin

**Focal seizures:** Previously “partial seizures” these start in area on one side of the brain.

**Generalized seizures:** Previously “primary generalized,” these engage or involve networks on both sides of the brain at onset.

**Unknown onset:** self explanatory; unsure if starts on one or both sides of brain.

**Focal to bilateral seizure:** starts on one side or part of the brain and spreads to both called “secondary generalized seizures.”

(Now the term “generalized” refers only to the start of a seizure.)

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Describing Awareness

**Focal aware:** If awareness remains intact, even if the person is unable to talk, it would be called “focal aware”. (Simple partial)

**Focal impaired awareness:** If awareness is impaired or affected at any time, even if pt has vague idea of what happened, it would be called “focal impaired awareness”. (Complex partial)

**Awareness unknown:** Sometimes it’s not known if a person is aware or not. It would be described as “awareness unknown.”

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Describing Motor/Other Symptoms in Focal Seizures

- **Focal motor seizure:** some type of movement occurs Ex. twitching, jerking, stiffening movements of a body part or automatisms (automatic licking lips, rubbing hands, walking, or running).
- **Focal non-motor seizure:** This type has other sx that occur 1st (∆ sensation, emotions, thinking)
- **Auras:** term to describe symptoms a person may feel in the beginning of a seizure (not new)

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Describing Generalized Onset Seizures

- **Generalized motor seizure:** The gen. tonic-clonic term is still used to describe seizures with stiffening (tonic) & jerking (clonic).
  - This loosely corresponds to “grand mal.”
- **Generalized non-motor seizure:** primarily absence seizures and the term corresponds to the old term “petit mal.” These seizures involve brief changes in awareness, staring, and some may have automatic or repeated movements like lipsmacking.
List the 3 ways in which seizures are classified

Where seizures begin in the brain
Level of awareness during a seizure
Other features of seizures

Partial Seizures
https://youtu.be/1JUeWeHinv-4

Baby Zacchaio 6 months
https://www.youtube.com/watch?v=yczul9sNGfc

Psychomotor Seizure

Myoclonic

Absence
Absence Seizures
Characterized by:
- Rapid blinking and/or chewing
- Unaware of what is going on during the episode with a quick return to full awareness after the event
- Can occur a few or up to hundreds of times a day!
- Often mistaken as daydreaming or poor attention
- Usually respond well to long-term treatment

Tonic clonic
https://youtu.be/BKiu_vT9Jo

Generalized Tonic Clonic
- Often begin with a sudden cry, a fall, rigidity or stiffness and muscle jerks
- Usually last only a couple of minutes
- The person may be irritable and sleepy for minutes to hours afterwards

Febrile Seizures
Perhaps the most common of all for EMS
Not considered a diagnosis of epilepsy
VERY SCARY for parents/caregivers
Self limited diagnosis

How do we intervene?
PEDS SEIZURES
- History
- History/frequency/type of seizures
- Prescribed meds and patient compliance; amount and time of last dose
- Recent or past head trauma; predisposing illness/disease; recent fever, headache, or stiff neck
- History of ingestion/drug or alcohol abuse; time last used
- SOPS p. 85

What other etiologies should be considered?
- Anoxia/hypoxia
- Anticonvulsant withdrawal/noncompliance
- Cerebral palsy or other disabilities
- Infection (meningitis, fever)
- Metabolic (glucose, electrolytes, acidosis)
- Toxin/intoxication (cocaine, cyclic)
- Trauma/child abuse
- Epilepsy
What particulars of the seizure should be documented if able?

Seizure description: focus of origin (one limb or whole body), progression / duration; presence of an aura, simple/complex; partial/generalized (focality/muscle activity); eye deviation prior to or during sz; incontinence; trauma to oral cavity; abnormal behaviors (lip smacking); duration of LOC. Duration / degree of MS ∆ in postictal period.

Other symptoms
- Unresponsiveness
- Loss of consciousness
- Possible loss of bladder or bowel control
- Excessive drooling
- Shallow breathing

Those susceptible
- Exhaustion, fatigue or under stress
- Excitement, anxious, fearful or sleepy

Fevers or infection can cause seizures

What treatment is needed?
- SAFETY; protect the pt
- Airway-SUCTION!
- MIDAZOLAM 0.1 mg/kg IVP/IO or 30-60 sec (0.2 mg/kg IN/IM) (Max single dose 5 mg) up to 10 mg IVP/IN/IO/IM to stop seizure.
- If seizures persist: contact OLMC for additional orders.
- Oxygen

When should EMS intervene?
If generalized tonic / clonic seizure activity still present upon arrival of EMS

For more information on specific seizures...
- Angelman Syndrome
- BenignRolandic Epilepsy
- CDKL5 Disorder
- Childhood Absence Epilepsy
- Dravet Syndrome
- Duane Syndrome
- Early Myoclonic Encephalopathy (EME)
- Epilepsy with Gastroenetral Epilepsy
- Juvenile Absence Epilepsy
- Juvenile Myoclonic Epilepsy
- Landau-Kleffner Syndrome
- Lennox-Gastaut Syndrome (LGS)
- Neurocutaneous Syndromes
- Ohtahara Syndrome
- Progressive Myoclonic Epilepsies
- Dravet Syndrome
- Febrile Seizures
- Infantile Spasms/West's Syndrome
- Juvenile Absence Epilepsy
- Juvenile Myoclonic Epilepsy
- Lafora Progressive Myoclonus Epilepsy
- Lennox-Gastaut Syndrome
- Landau-Kleffner Syndrome
- Lennox-Gastaut Syndrome (LGS)
- Neurocutaneous Syndromes
- Ohtahara Syndrome
- Progressive Myoclonic Epilepsies
- Rasmussen's Syndrome
- Hyperinsulinemic Syndromes
- Infantile Spasms/West's Syndrome
- Juvenile Absence Epilepsy
- Juvenile Myoclonic Epilepsy
- Tubular Amyloid Epilepsy
- Epilepsy of Infancy with Migrating Focal Seizures
- http://www.epilepsy.com/learn/types-epilepsy-syndromes

Where to start?
- Lifespan differences
- Ethnic and cultural group needs
- Diversity in population
- Physical or mental disability
- Homelessness
- Bariatric
- Verbal impairments
- Cardiac devices
  - Implanted defibrillators
  - Life vests
  - LVADS
- High-tech kids
  - AV shunts
  - Trachs
  - G tubes
- Hearing devices

http://www.epilepsy.com/learn/types-epilepsy-syndromes

Handout p. 8-14

Seizures, Submersion and Special Needs
Populations
In your handout p. 8-9
Central & peripheral lines & catheters that might be seen in the pre-hospital setting
- Hickman
- PICC
- Triple lumen
- Port-a-cath
- Medi-port

Shunts
Lets read: start on the right column on p. 9 through left column on p. 10

Why do patients require insertion of a shunt?
↑ CSF

What is the purpose of the shunt for the patient?
To divert the CSF and decrease pressure on the brain

Shunt Malfunctions
What is the usual cause of malfunction?
Mechanical malfunction such as obstruction

Tracheostomy
We are familiar with crics that EMS places in the emergent pre-hospital setting, but what is unfamiliar is the equipment
Ventricular Assist Devices

A VAD is a mechanical pump that is used to support heart function and blood flow in people who have weakened hearts.

How does it work?
The device takes blood from the left ventricle in the heart and supplements the ejection fraction to adequately supply it to the rest of the body and vital organs.

So what’s the power source?
- Batteries
- AC power

Interesting facts about VADs?
- Patients may NOT have a pulse and still be alive, therefore; Auscultate the chest wall to hear if the device is functioning (whirling sound)
- BP may NOT be heard except with doppler
**Seizures, Submersion and Special Needs Populations**

**Highest PRIORITY**

**KEEP CALM AND ASK FOR HELP**

CALL the VAD coordinator!!!

**Life Vests for defibrillation**

*Huntley man saved after sudden cardiac arrest by defibrillator vest*

**Autism**

Please read in handout bottom of page 12-13

**Wearable defibrillator**

https://www.youtube.com/watch?v=odnijh_89iwo

**PCRs**
Dry Drowning


Ryan Kim

Questions?