RSS SESSION SIGN-IN SHEET

Pediatric Care Echo Series
Pediatric Status Epilepticus
June 15, 2017
Megan Peters, MD

RSS Global Objective(s): Assess pediatric trauma given the news skills and guidelines determined to be safe for children. Identify proper tool and standardized measurement practices to improve diagnosis and treatment of pediatric patients.

Policy on Disclosure

It is the policy of the University of Wisconsin School of Medicine and Public Health that anyone with a CME planning role for this activity (persons who may influence content) disclose all relevant financial relationships with commercial interests* in order to allow CME staff to identify and resolve any potential conflicts of interest. Disclosure of any planned discussions of unlabeled/unapproved uses of drugs or devices during each presentation is required. For this educational activity all conflicts of interests have been resolved and detailed disclosures are listed below:

Name/Role	Financial Relationship Disclosures	Discussion of Unlabeled/Unapproved uses of drugs/devices in presentation?
Jonathan Kohler, MD Presenter, Chair	No relevant financial relationships to disclose	No
Veronica Watson Coordinator	No relevant financial relationships to disclose	No
Randi Cartmill, Coordinator	No relevant financial relationships to disclose	No
Danielle Hepting, OCPD Staff	No relevant financial relationships to disclose	No
Benjamin Eithun, MSN, RN, Coordinator	No relevant financial relationships to disclose	No
Mary Jean Erschen, Coordinator	No relevant financial relationships to disclose	No
Megan Peters, MD	No relevant financial relationships to disclose	No

** The ACCME defines a commercial interest as any entity producing, marketing, re-selling, or distributing health care goods or services consumed by, or used on, patients. The ACCME does not consider providers of clinical service directly to patients to be commercial interests.*

My signature below verifies that I have attended this CME activity and have been fully disclosed (see reverse) of any real or apparent conflicts of interest that may have a direct bearing on the subject matter of this CME activity. This pertains to relationships with pharmaceutical companies, biomedical device manufacturers, or other corporations whose products or services are related to the subject matter of the presentation topic. This also pertains to relationships with the commercial supporter of this CME activity None

UW Health
American Family Children's Hospital

School of Medicine and Public Health
UNIVERSITY OF WISCONSIN-MADISON

Pediatric Status Epilepticus

Megan Peters, MD
Assistant Professor
Pediatric Critical Care Medicine

UW Health
American Family Children's Hospital

School of Medicine and Public Health
UNIVERSITY OF WISCONSIN-MADISON

RSS SESSION SIGN-IN SHEET

Pediatric Care Echo Series
Pediatric Status Epilepticus
June 15, 2017
Megan Peters, MD

RSS Global Objective(s): Assess pediatric trauma given the news skills and guidelines determined to be safe for children. Identify proper tool and standardized measurement practices to improve diagnosis and treatment of pediatric patients.

Policy on Disclosure

It is the policy of the University of Wisconsin School of Medicine and Public Health that anyone with a CME planning role for this activity (persons who may influence content) disclose all relevant financial relationships with commercial interests* in order to allow CME staff to identify and resolve any potential conflicts of interest. Disclosure of any planned discussions of unlabeled/unapproved uses of drugs or devices during each presentation is required. For this educational activity all conflicts of interests have been resolved and detailed disclosures are listed below:

Name/Role	Financial Relationship Disclosures	Discussion of Unlabeled/Unapproved uses of drugs/devices in presentation?
Jonathan Kohler, MD Presenter, Chair	No relevant financial relationships to disclose	No
Veronica Watson Coordinator	No relevant financial relationships to disclose	No
Randi Cartmill, Coordinator	No relevant financial relationships to disclose	No
Danielle Hepting, OCPD Staff	No relevant financial relationships to disclose	No
Benjamin Eithun, MSN, RN, Coordinator	No relevant financial relationships to disclose	No
Mary Jean Erschen, Coordinator	No relevant financial relationships to disclose	No
Megan Peters, MD	No relevant financial relationships to disclose	No

** The ACCME defines a commercial interest as any entity producing, marketing, re-selling, or distributing health care goods or services consumed by, or used on, patients. The ACCME does not consider providers of clinical service directly to patients to be commercial interests.*

My signature below verifies that I have attended this CME activity and have been fully disclosed (see reverse) of any real or apparent conflicts of interest that may have a direct bearing on the subject matter of this CME activity. This pertains to relationships with pharmaceutical companies, biomedical device manufacturers, or other corporations whose products of services are related to the subject matter of the presentation topic. This also pertains to relationships with the commercial supporter of this CME activity None

School of Medicine and Public Health
UNIVERSITY OF WISCONSIN-MADISON

Key Practice Recommendations:

1. **Stop** seizure as soon as possible
2. Rapidly **recognize** and **treat** reversible causes
3. Consistent and rapid antiepileptic drug (AED) administration
   - Administer at least **3 AEDs in first 60 minutes** of continuous seizure activity
4. Maintain adequate **airway**, **breathing**, and **circulation**

UW Health American Family Children's Hospital

School of Medicine and Public Health
UNIVERSITY OF WISCONSIN-MADISON

Case – 5yo female

Comes in to the ED – seizures began at home about 10 minutes ago

Previously healthy

4 days of vomiting and diarrhea, poor appetite, keeping down fluids OK, acting “lethargic” all week

Never hospitalized

No medications or known allergies

UW Health
American Family Children’s Hospital

School of Medicine and Public Health
UNIVERSITY OF WISCONSIN-MADISON

New Definitions – Neurocritical Care Society 2012

- **Status epilepticus (SE)**
  - **5 minutes** or more of continuous clinical and/or electrographic seizure activity
  - **recurrent** seizure activity **without return to baseline** mental status between seizures
- **Refractory status epilepticus (RSE)**
  - SE that **does not respond** to standard treatment regimens (benzodiazepine plus a second AED)

UW Health
American Family Children's Hospital

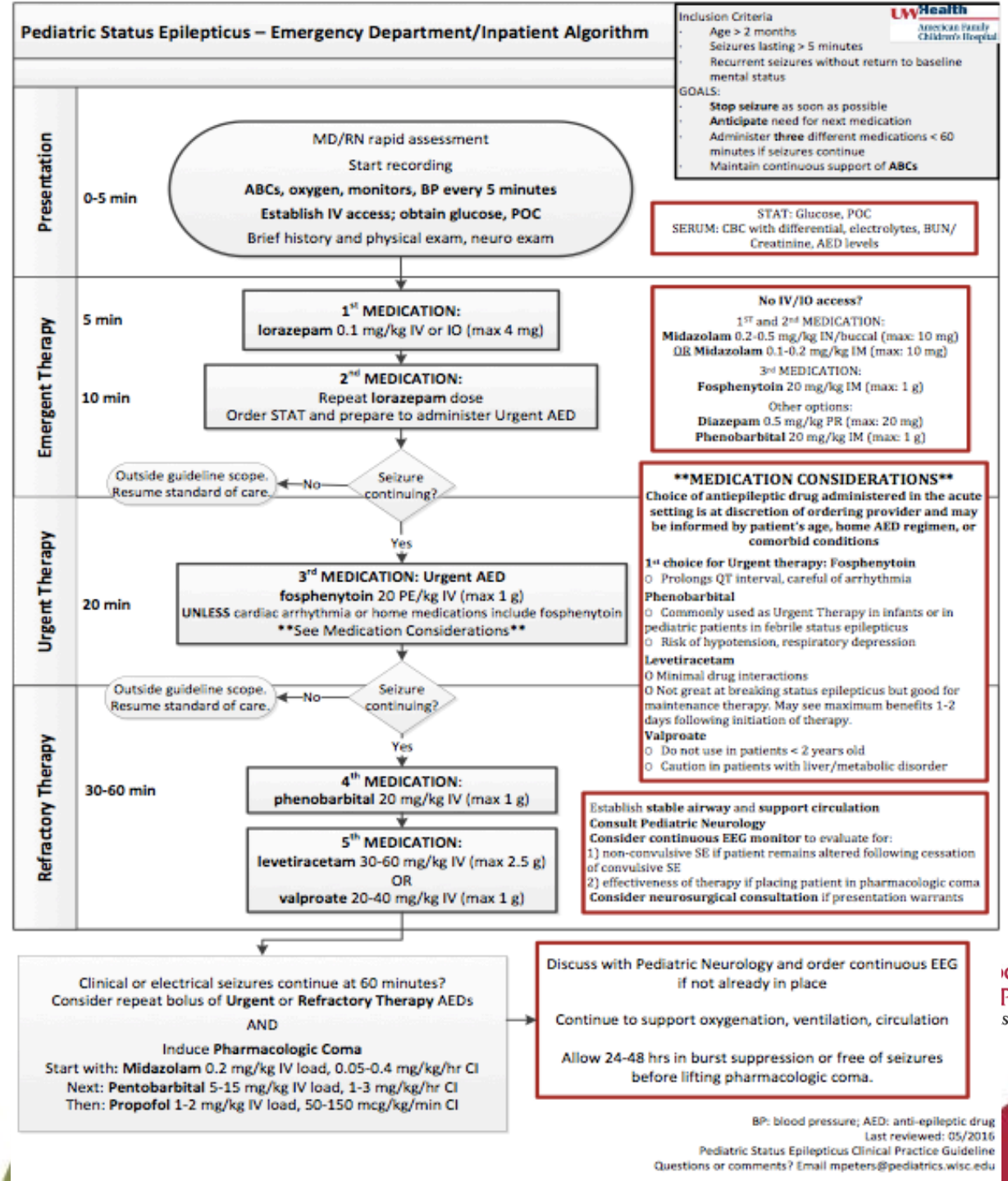
School of Medicine and Public Health
UNIVERSITY OF WISCONSIN-MADISON

What do we do now?

- SE = Medical Emergency!
- Requires 3 simultaneous actions
  - Stabilize, support ABC
  - Rapidly identify reversible causes
  - Administer anti-seizure meds ASAP
- Clinical pathway
  - Decrease unintended variability in delivery of care
  - Minimize delays
  - Provide evidence-based recommendations

UW Health
American Family Children's Hospital

School of Medicine and Public Health
UNIVERSITY OF WISCONSIN-MADISON



ol of Medicine
Public Health
SITY OF WISCONSIN-MADISON

Treatment Timeline – **0-5 minutes**

- **Note time of seizure onset**
- **Support ABCs**
- **Apply monitoring devices**
  - Continuous cardiac rhythm monitoring
  - Pulse oximetry
  - Blood pressure every 5 min
- **Apply high FiO_2 if hypoxemic**
  - Assess for low oxygen or hypoventilation
  - NRB or BVM

UW Health American Family Children's Hospital

School of Medicine and Public Health
UNIVERSITY OF WISCONSIN-MADISON

Back to our patient

HR 156 BP 130/74 RR 32 SpO2 93%

Temp 38.5 Weight 20 kg

Breath sounds coarse, but air entry bilaterally

Pulses 1+, capillary refill 4 seconds

Skin is clammy, cold to elbows and knees

Generalized convulsions, pupils 4mm and reactive

Midazolam 4 mg IN

POC glucose 29

UW Health American Family Children's Hospital

School of Medicine and Public Health
UNIVERSITY OF WISCONSIN-MADISON

Treatment Timeline – **0-5 minutes**

- **Assess POC glucose ("ABC-DEFG")**
- **Establish IV or IO access**
- **Collect critical labs**
  - Electrolytes, special consideration to **Na, Mg, Ca**
  - CBC
  - Antiepileptic drug levels as needed
  - Also consider: blood gas, LFTs, ammonia, coags, tox screen
- **Targeted H&P**
- **Targeted Neuro exam**
  - Fontanelle
  - Pupils
  - Eye deviation
  - Focality of convulsions

UW Health
American Family Children's Hospital

School of Medicine and Public Health
UNIVERSITY OF WISCONSIN-MADISON

Emergent Therapy – **5 & 10 min**

- **Correct what you can**
  - Glucose
  - Sodium
  - Calcium
  - Magnesium
- **Administer Benzodiazepine**
- **Administer a maximum of two BZD doses (including pre-hospital)**
- **IV or IO access: Lorazepam 0.1 mg/kg**
  - Max dose: 4 mg

UW Health American Family Children's Hospital

School of Medicine and Public Health
UNIVERSITY OF WISCONSIN-MADISON

Our patient again, 5 min into stay

Head positioning, oxygen by NRB

Peripheral IV

5 mL/kg of 10% dextrose solution

Lorazepam 2mg IV (5 min after midazolam)

Convulsions stop after total 15 min seizure

HR 122 BP 100/60 RR20 SpO2 95%

20 mL/kg of NS for persistent delayed cap refill

Starts opening eyes

UW Health American Family Children's Hospital

School of Medicine and Public Health
UNIVERSITY OF WISCONSIN-MADISON

Emergent Therapy – **5 & 10 min**

- **No IV or IO access?**
  - Midazolam
    - IM: 0.1 – 0.2 mg/kg
    - Buccal or IN: 0.2 – 0.5 mg/kg
    - Max dose: 10 mg
  - Diazepam
    - PR 0.5 mg/kg
    - Max dose: 20 mg
- **After giving 2nd BDZ, prepare third AED**

UW Health American Family Children's Hospital

School of Medicine and Public Health UNIVERSITY OF WISCONSIN-MADISON

Urgent Therapy – **20 min**

- **Fosphenytoin 20 PE/kg IV –**
  - Max dose: 1 gram
  - Drug of choice for most patients
  - Can be arrhythmogenic, prolongs QTc
- **Phenobarbital 20 mg/kg IV**
  - Max dose: 1 gram
  - Commonly first drug of choice for neonates, febrile SE
- **Don’t forget ongoing support of ABCs!**

UW Health American Family Children’s Hospital

School of Medicine and Public Health
UNIVERSITY OF WISCONSIN-MADISON

Refractory Therapy – **30-60 min**

- **Other medication options:**
  - Phenobarbital 20 mg/kg IV
  - Levetiracetam (Keppra) 30-60 mg/kg IV
  - Valproate 20-40 mg/kg IV
- **Consult with Neurologist**
- **Repeat doses of previous meds**
- **Goal – deliver 3 AED medications before 60 minutes**

UW Health American Family Children's Hospital

School of Medicine and Public Health
UNIVERSITY OF WISCONSIN-MADISON

Post-seizure management

- Admission
- Continue to monitor and support ABC's
- Follow up corrected hypoglycemia or electrolyte disturbances

Thank you for your attention!

Questions?

UW Health
American Family Children's Hospital

School of Medicine and Public Health
UNIVERSITY OF WISCONSIN-MADISON

Other considerations

- Induce pharmacologic coma
- Lumbar puncture
- Urgent EEG monitoring
- Urgent CT imaging

UW Health
American Family Children's Hospital

School of Medicine and Public Health
UNIVERSITY OF WISCONSIN-MADISON