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**ED Neurological  
Emergencies Patients'  
Neuroresuscitation Update:  
Seizure & Status Epilepticus  
Management Procedure**


Edward P. Sloan, MD, MPH, FACEP 



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Edward P. Sloan, MD, MPH, FACEP 

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**Edward P. Sloan, MD, MPH FACEP**

*Professor*

*Department of Emergency Medicine  
University of Illinois College of Medicine  
Chicago, IL*


Edward P. Sloan, MD, MPH, FACEP 

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**Attending Physician  
Emergency Medicine**

*University of Illinois Hospital  
Our Lady of the Resurrection Hospital*


**Chicago, IL**

Edward P. Sloan, MD, MPH, FACEP 

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**Global Objectives**

- Improve neurological emergencies Rx
- Know how to quickly evaluate patients
- Determine how to use empiric meds
- Provide evidence-based protocols
- Facilitate disposition, improve pt outcome
- Improve Emergency Medicine practice

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## Session Objectives

- Present relevant patient cases
- Discuss key clinical questions
- Review the procedures
- Restate driving principles
- Seizures and SE

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## Methodology

- Identify key neurological emergencies
- Consider key clinical questions
- Search the medical literature
- Focus on evidence that supports practice
- Utilize [www.guidelines.gov](http://www.guidelines.gov), [www.acep.org](http://www.acep.org)
- Integrate into procedures

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## A Guidelines Perspective

- Key questions define clinical practice
- Robust literature, accessed via internet
- Actual practice standards are limited
- Most of what we do is well defined
- No need to greatly vary what we do best: empirically treat, stabilize, diagnose, and disposition pts during unstable ED period

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## A Perspective on Procedures

- Critically ill ED patients
- True medical emergencies
- Limited time and resources
- A need to diagnose and act
- “Emergency physicians take a surgeon’s approach to medical emergencies.”
- We do procedures, we are good at them

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## Procedures & Clinical Practice

- Guidelines, pathways, protocols
- Procedures
- Translate research into clinical practice
- Specific, quantifiable
- Documented via medical record
- Viewed favorably in retrospect
- Lead to consistency, improved pt outcome

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## Patient EMS Data

- 50?? yo male John Doe
- Generalized tonic-clonic seizure
- Chicago Fire Department
- Diazepam 5 mg IM, 15 mg IV
- Seizure continuous for 15 minutes +
- EMS to ED
- No change in status

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## Patient Clinical History

- Unknown meds
- Unknown medical history
- Hx Needs surgery next month ??
- EtOH ??
- Does not appear to be homeless
- Accucheck 119

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## ED Presentation

- Facial and shoulder twitching R
- Pt with gurgling BS
- Nasopharyngeal airway
- No evidence of trauma or toxicity
- IV access in neck
- Seizure persists x minutes

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## Seizure Patient Questions

- Is this a seizure?
- Is this status epilepticus?
- What is the pathophysiology?
- What is the best management?
- What is the likely patient outcome?

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## ED Status Epilepticus Patients: *The Procedure*

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## Seizure/SE Rx Procedure

- Evaluate globally all resuscitation needs

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## Seizure/SE Rx Procedure

- Evaluate globally all resuscitation needs
- Administer a benzodiazepine x 4-5
  - Diazepam 5 mg q 2-5 min
  - Lorazepam 2 mg q 2-5 min
  - Midazolam 2-5 mg q 2-5 min

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### Seizure/SE Rx Procedure

- Evaluate globally all resuscitation needs
- Administer a benzodiazepine x 4-5
  - Diazepam 5 mg q 2-5 min
  - Lorazepam 2 mg q 2-5 min
  - Midazolam 2-5 mg q 2-5 min
- Order a fosphenytoin bolus infusion

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### Seizure/SE Rx Procedure

- Infuse fosphenytoin 1 gr PE in 7-10 min

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### Seizure/SE Rx Procedure

- Infuse fosphenytoin 1 gr PE in 7-10 min
- Repeat fosphenytoin 1 gr infusion

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### Seizure/SE Rx Procedure

- Infuse fosphenytoin 1 gr PE in 7-10 min
- Repeat fosphenytoin 1 gr infusion
- Order an IV valproate infusion

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### Seizure/SE Rx Procedure

- Infuse fosphenytoin 1 gr PE in 7-10 min
- Repeat fosphenytoin 1 gr infusion
- Order an IV valproate infusion
- Infuse IV valproate 1500 mg over 5 min

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### Seizure/SE Rx Procedure

- Infuse fosphenytoin 1 gr PE in 7-10 min
- Repeat fosphenytoin 1 gr infusion
- Order an IV valproate infusion
- Infuse IV valproate 1500 mg over 5 min
- Order phenobarbital for bolus infusion

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### Seizure/SE Rx Procedure

- Infuse fosphenytoin 1 gr PE in 7-10 min
- Repeat fosphenytoin 1 gr infusion
- Order an IV valproate infusion
- Infuse IV valproate 1500 mg over 5 min
- Order phenobarbital for bolus infusion
- Infuse phenobarbital 100-200 mg q5 min x 5

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### Seizure/SE Rx Procedure

- Prepare for endotracheal intubation
- Prepare for continuous infusion of midazolam or propofol
- Complete a head CT
- Consult a neurologist for EEG monitoring
- Disposition to the ICU
- Document SE Rx, complications, expected outcome

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### Special SE Procedure Concepts

- Consider not using phenobarbital or other bolus infusions after phenytoins
- Go directly from benzodiazepines & phenytoins to a continuous infusion
- Propofol provides burst suppression
- EEG for coma, continuous infusion AED, or following RSI with paralytic use

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### Propofol Continuous Infusion

- 3 mg/kg loading dose
- 50 - 250 mcg/kg/min maintenance
- This is 3 – 15 mg/kg/hr
- Rapid onset, easily reversed
- Caution

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### Midazolam Continuous Infusion

- 200 mcg/kg loading dose (10-20 mg)
- 1-10 mcg/kg/min maintenance
- This is 2 mg/hr as initial infusion
- Caution

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### ED SE Patient Rx Timeline

- 0-20 min: ABCs, benzodiazepines
- 20-40 min: Phenytoins infusions
- 40-60 min: Phenobarbital/valproate bolus infusions
- 60-80 min: Midazolam/propofol continuous infusions
- 80-120 min: CT, Neurology, EEG, ICU

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## ED Patient Outcome

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## ED Patient Management

- Lorazepam 2 mg IVP x 5 over 10 minutes
- Persistent facial and R shoulder activity
- AMS: generalized seizure continues
- Fosphenytoin 1 gram PE over 10 min
- Fosphenytoin 1 gram PE over 10 min
- Seizure ended, pt remained obtunded
- Intubation immediately followed
- Lidocaine, sux, rocuronium

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## ED Diagnostic Evaluation

- Non-contrast CT: Prior strokes, atrophy
- Metabolic tests normal
- Toxicology screening negative
- Phenytoin level cancelled
- Diagnoses:
  - AMS
  - Status Epilepticus
  - Respiratory Failure

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## Family Arrives, Pt History

- Pt with history refractory seizures
- Hx carotid artery occlusion R
- Due for carotid endarterectomy
- Phenobarbital & dilantin, compliant
- Prior history of SE treated at UIC
- No medic alert bracelet
- No recent illness, trauma, EtOH

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## Patient Outcome

- EEG in ED, within 150 minutes
- Neuro consultation, no subtle SE
- Admit to Neuro ICU
- Repeated paralytic dosing
- Final disposition for carotid Rx

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## SE Key Principles

- Diagnose SE and subtle SE
- Stop the seizure, minimize complications
- Use a benzodiazepine and a phenytoin
- Consider valproate if pt on PO Depakote
- Consider the use of phenobarbital
- Be able to infuse midazolam or propofol
- Get an EEG with persistent coma

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Neuroresuscitation in Seizures and Status Epilepticus  
Edward P. Sloan, MD, MPH, FACEP**

*Thank you.*

[www.ferne.org](http://www.ferne.org)  
[ferne@ferne.org](mailto:ferne@ferne.org)

[edsloan@uic.edu](mailto:edsloan@uic.edu)  
312 413 7490

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