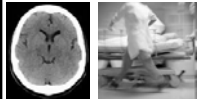


FERNE/MEMC Session:


**Optimal Treatment of
Neurological Emergencies
Patients**




Edward P. Sloan, MD, MPH 

Featuring a Panel Discussion:

**“Care of the Ill and
Agitated Patient”**



Edward P. Sloan, MD, MPH, FACEP 


2009 MEMC V Meeting




**Valencia, Spain
16 September 2009**

Edward P. Sloan, MD, MPH, FACEP 

**Optimizing Seizure and
SE Patient Management:
Key Concepts &
Clinical Policy Review**




Edward P. Sloan, MD, MPH, FACEP 

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Disclosures

- FERNE Chairman and President
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- ACEP Clinical Policy Committee
- 2009 MEMC Educational activities supported by an Educational Grant from Alexza Pharmaceuticals

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Overview

- Seizure and SE patients are ill
- Care can easily be optimized
- Patient case presentation
- Review clinical policies
- Discuss how to learn
- Address obligations, options
- Conclude the case

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A Seizure/SE Patient Case

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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

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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 x minutes

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Clinical Policy: Critical Issues in the Evaluation and Management of Adult Patients Presenting to the Emergency Department With Seizures

Policy statements and clinical policies are the official policies of the American College of Emergency Physicians and, as such, are not subject to the same peer review process as articles appearing in the journal. Policy statements and clinical policies of ACEP do not necessarily reflect the policies and beliefs of Annals of Emergency Medicine and its editors.

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This clinical policy focuses on critical issues in the evaluation and management of adult patients with seizures. The medical literature was reviewed for articles that pertained to the critical questions posed. Subcommittee members and expert peer reviewers also supplied articles with direct bearing on this policy. This clinical policy focuses on 6 critical questions:

- I. What laboratory tests are indicated in the otherwise healthy adult patient with a new-onset seizure who has returned to a baseline normal neurologic status?
- II. Which new-onset seizure patients who have returned to a normal baseline require a head computed tomography (CT) scan in the emergency department (ED)?
- III. Which new-onset seizure patients who have returned to normal baseline need to be admitted to the hospital and/or started on an antiepileptic drug?
- IV. What are effective phenytoin or fosphenytoin dosing strategies for preventing seizure recurrence in patients who present to the ED after having had a seizure with a subtherapeutic serum phenytoin level?

New Onset Sz: Lab Testing

- What lab tests are indicated in the otherwise healthy adult patient with a new onset seizure who has returned to a baseline normal neurological status?
- (Outcome measure: abnormal lab that
 - changes management)

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New Onset Sz: Lab Testing

- Level B recommendations:
 - Determine a serum glucose and sodium on patients with a first time seizure with no co-morbidities who have returned to their baseline
 - Obtain a pregnancy test in women of child bearing age
 - Perform a LP after a head CT either in the ED or after admission on patients who are immuno-compromised

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New Onset Sz: Neuroimaging

- Which new onset seizure patients who have returned to a normal baseline require neuroimaging in the ED?
- (Outcome measure: abnormal CT)

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New Onset Sz: Neuroimaging

- Level B recommendations:
 - When feasible, perform a head CT of the brain in the ED on patients with a first time seizure
 - Deferred outpatient neuroimaging may be utilized when reliable follow-up is available

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New Onset Sz: Dispo/AED Use

- Which new onset seizure patients who have returned to normal baseline need to be admitted to the hospital and / or started on an AED?
- (Outcome measure: short term morbidity or mortality)

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New Onset Sz: Dispo/AED Use

- **Level C recommendations:**
 - Patients with a normal neurological examination can be discharged from the ED with outpatient follow-up
 - Patients with a normal neurological examination and no co-morbidities and no known structural brain disease do not need to be started on an anti-epileptic drug in the ED

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Sz/SE: Phenytoin Loading

- What are effective phenytoin dosing strategies for preventing seizure recurrence in patients who present to the ED with a sub-therapeutic serum phenytoin level?
 - (Outcome measure: short term
 - seizure recurrence)

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Sz/SE: Phenytoin Loading

- Level C recommendation:
 - Administer an intravenous or oral loading dose of phenytoin or intravenous or intramuscular fosphenytoin, and restart daily oral maintenance dosing.

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Sz/SE SE Therapeutics

- What agent(s) should be administered to a patient in status who continues to seize despite a loading dose of a benzodiazepine and a phenytoin?
 - (Outcome measure: cessation of
 - motor activity)

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Sz/SE SE Therapeutics

- **Level C recommendation:**
 - Administer one of the following agents intravenously: “high-dose phenytoin,” phenobarbital, valproic acid, midazolam infusion, pentobarbital infusion, or propofol infusion.

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Sz/SE: EEG Monitoring

- When should an EEG be performed in the ED?

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Sz/SE: EEG Monitoring

- **Level C recommendation:**
 - Consider an emergent EEG for patients suspected of being in non-convulsive SE or in subtle convulsive SE, for patients who have received a long-acting paralytic, or for patients who are in a drug-induced coma.

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ACEP Summary

- Evidence based clinical policies are useful tools in clinical decision making
- Policy does not create a “standard of care”
- Provides a foundation for clinical practice at a national level

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ACEP Summary

- The current literature does not support the creation of any “level A” recommendations
 - 2 of the 6 clinical questions have sufficient evidence to support “level B” recommendations
 - 4 of 6 recommendations are “level C”

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Postscript

- What does the policy tell us, and how does it help us?
- What is relevant years later?
- Why should we care?

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New Onset Seizure Patients

- Assure normal mental status
- Individualized care
- No risk
- Do the right thing
- Optimize patient outcome

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Phenytoin Loading

- Choose a method that is useful
- Individualized care
- No risk
- Do the right thing
- Optimize patient outcome

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Phenytoin Loading

- May impact long term AED choice over the short term
- This is a secondary concern
- Document partial seizure onset
- Inform the neurologist
- Consider consultation prior to loading with any AED

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Refractory SE

- Optimize benzodiazepines use
- Use a phenytoin when indicated
- Other drugs then equal in efficacy
- Some choose general anesthesia
- Burst suppression
- IV midazolam, IV propofol

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EEG Use

- To diagnose subtle SE
- When pt sedated, intubated
- Non-responsive without sedation
- Schedule for the ICU ASAP
- Duty of the neurologist and institution to provide this diagnostic test in a timely manner

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This Clinical Policy

- This policy creates value for the practitioner
- No liability in variability, as long as something happens according to plan in support of the patient
- Your lawyers (and you) will be helped the most by reviewing and using this policy

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Subsequent Policies

- 1993 EFA SE Guidelines in JAMA
- ~2000 attempt to revise
- Use only class I data, from RCCTs
- Only one publication
- VA cooperative study (*NEJM*, 1998)
- Proposes benzodiazepines
- Then it's dealer's choice (+ / -)
- No revision to date

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The New England Journal of Medicine

A COMPARISON OF FOUR TREATMENTS FOR GENERALIZED CONVULSIVE STATUS EPILEPTICUS

DAVID M. TREIMAN, M.D., PATR D. MEYERS, M.P.A., NANCY Y. WALTON, Ph.D., JOSEPH F. COLLINS, Sc.D., CINDY COLLINS, R.Ph., M.S., A. JAMES ROWAN, M.D., ADRIAN HANDFORTH, M.D., EDWARD FAUGHT, M.D., VINCENT F. CALABRESE, M.D., BASIM M. UTHMAN, M.D., R. EUGENE RAMSAY, M.D., AND MEENAL B. MAMDANI, M.D., FOR THE VETERANS AFFAIRS STATUS EPILEPTICUS COOPERATIVE STUDY GROUP*

ABSTRACT

Background and Methods Although generalized convulsive status epilepticus is a life-threatening emergency, the best initial drug treatment is uncertain. We conducted a five-year randomized, double-blind, multicenter trial of four intravenous regimens: diazepam (0.15 mg per kilogram of body weight) followed by phenytoin (18 mg per kilogram), lorazepam (0.1 mg per kilogram), phenobarbital (15 mg per kilogram), and phenytoin (18 mg per kilogram). Patients were classified as having either overt generalized status epilepticus (defined as easily visible generalized convulsions) or subtle status epilepticus (indicated by coma and ictal discharges on the electroencephalogram, with or without subtle convulsive

STATUS epilepticus is a life-threatening emergency that affects 65,000¹ to 150,000² people in the United States each year. Generalized convulsive status epilepticus is the most common and most dangerous type.

Phenobarbital,^{3,5} phenytoin,⁶⁻¹⁴ diazepam plus phenytoin,^{15,16} and lorazepam^{17,28} have been advocated for the initial treatment of generalized convulsive status epilepticus, and each is used by a substantial number of physicians.³ There are few data from controlled trials, however, to document the efficacy of these treatments, and they have not been directly compared. We therefore undertook this study to compare the efficacy of standard doses of these four drugs


Big Picture

- It's time to review the clinical policy
- There are no new data to support our clinical care or the policy
- Industry only will support research
- Exception to informed consent
- NETT is one source of optimism
- There will be no short term change in our treatment paradigm

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What Should You Do?

- Learn and know more
- Know your clinical options
- Treat efficiently and effectively
- Document well

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Learn and Know More

- Read the ACEP clinical policy
- Learn at the *FERNE.org* website
- Read relevant clinical review articles
- Go to *Guidelines.gov*
- Read a clinical policy summary

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Clinical Policy: Critical Issues in the Evaluation and Management of Adult Patients Presenting to the Emergency Department With Seizures

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605 (1 of 21)

Education

Web-based Learning: Website




www.ferne.org


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Education

Web-based Learning: Video Slideshows

- Audio, video and slide content
- Able to access individual slides, specific content
- MS Producer, viewable with Windows Media Player



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"Dedicated to improving the care of
 with neurological emergencies
 10 Year Anniversary 1997-2007

ACEP Clinical Policy: Critical Issues in the Evaluation and Management of Adult Patients Presenting to the Emergency Department with Seizures

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"Dedicated to improving the
 with neurological care
 10 Year Anniversary 1997-2007

**Managing ED Seizure and SE Patients:
 When Do We Use Which Parenteral Antiepileptic Drugs, and Does It Depend on Oral AED Use?**

Edward P. Sloan, MD, MPH, FACEP
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Meeting Main Page [FERNE Homepage](#)
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Seizure workshop supported by Ortho-McNeil Neurologics, Inc.

FERNE: Seizure, SE Pt Workshop Workbook Page 1 of 14

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**Treating Emergency Department Seizure and Status Epilepticus Patients:
 Optimal Treatment Workshop
 Non-IV Parenteral AEDs**

1. List 5 anti-epileptic drugs (AEDs) that can be given intramuscular (IM) in an actively seizing patient.

- 1.
- 2.
- 3.

EMERGENCY MEDICINE PRACTICE
 EBMEDICINE.NET
 AN EVIDENCE-BASED APPROACH TO EMERGENCY MEDICINE

October 2006
 Volume 8, Number 10

The Swollen Extremity: A Systematic Approach To The Evaluation Of A Common Complaint

It is another busy night in the emergency department; five admitted patients are waiting for beds and three patients are waiting for CT scans. Space and resources are limited. Your next patient is an obese, 35-year-old, female visitor from Australia with no known medical problems. She tells you that she never comes to the emergency room, but decided to come in tonight because the pain in her right leg was keeping her awake. She has had mild to moderate pain in both knees "for a long time," but for the last two days her right lower leg has been progressively painful and swollen. She has been staying off her feet and taking ibuprofen, but the pain and swelling are not getting better. She also complains of a mild discomfort in her chest which she can not characterize. Her blood pressure is 140/90 mmHg, pulse is 100, respiratory rate is 20, temperature is 37.2°C, and her pulse oximetry is reading 95%. You note that her right ankle is difficult to

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PEDIATRIC EMERGENCY MEDICINE PRACTICE
 AN EVIDENCE-BASED APPROACH TO PEDIATRIC EMERGENCY MEDICINE EBMEDICINE.NET

Fever Caused By Occult Infections In The 3-To-36-Month-Old Child

July 2007
 Volume 4, Number 7

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CME Objectives
 Upon completing this article, you should be able to:
 1. Review and critically appraise existing pediatric

*It's 3 am and the ED is winding down. You look up to find that the next patient to be seen is a 9-month-old with the chief complaint of "fever." You swing down the last of your lukewarm coffee, grab the chart, and head off to room 5.
 On entering, you find a teary-eyed white female infant sitting in her mother's lap, crying you suspiciously. Mom relates that she has been ill for the past three days with upper respiratory congestion and a nonproductive cough, which her mom has been treating with an over-the-counter decongestant. Today, however, the child was less active, drank less of her formula than usual, and felt hot to the touch, prompting Mom to check her temperature. Her initial fever of 101.2°F responded to a dose of acetaminophen, but when the mother rechecked the child's temperature several hours later, it had climbed to 103.5°F, so she called her pediatrician's answering service and was told to bring her immediately to the emergency department.
 The young girl has had two episodes of nonbloody, nonbilious emesis related to her cough, no diarrhea or rash, and has maintained her urinary output. She has*

National Guideline Clearinghouse
 www.guideline.gov

Search Results

Search criteria:
 Keyword: status epilepticus

Your search found 17 related guidelines, which are listed below by relevance. Use the "Limit" button to view a guideline summary, click on a title below.

Limit Search Select All Add to My Collection

Items 1 to 17


Title

Practice parameter: diagnostic assessment of the child with status epilepticus. Lenox Hill Hospital - Medical Specialty Society - National Government Agency (Non-U.S.). 2004 Oct. 525 pages. NGC:009225

The diagnosis and management of the epilepsies in adults and children in primary and secondary care. National Government Agency (Non-U.S.). 2004 Oct. 525 pages. NGC:009225

Use of serum prolactin in diagnosing epileptic seizures. Report of the Therapeutics and Technology Assessment Subcommittee of the American Academy of Neurology - Medical Specialty Society. 2005 Sep. 8 pages. NGC:005316

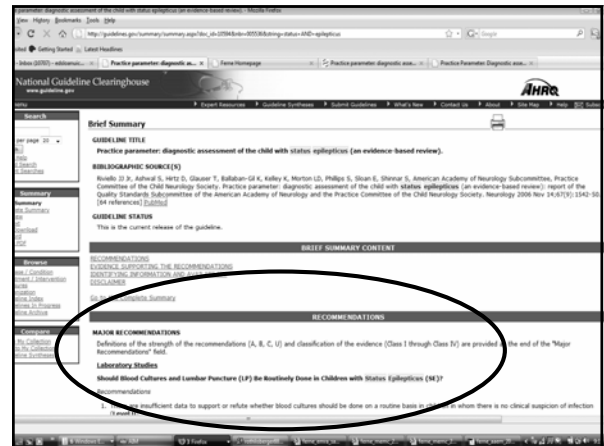
Special Article



Practice Parameter: Diagnostic assessment of the child with status epilepticus (an evidence-based review)
 Report of the Quality Standards Subcommittee of the American Academy of Neurology and the Practice Committee of the Child Neurology Society

J.J. Rivielo, Jr., MD; S. Ashwal, MD; D. Hirtz, MD; T. Glauser, MD; K. Ballaban-Gil, MD; K. Kelley, MD; L.D. Morton, MD; S. Phillips, MD; E. Sloan, MD; and S. Shinnar, MD, PhD


Abstract—Objective: To review evidence on the assessment of the child with status epilepticus (SE). **Methods:** Relevant literature were reviewed, abstracted, and classified. When data were missing, a minimum diagnostic yield was calculated. Recommendations were based on a four-tiered scheme of evidence classification. **Results:** Laboratory studies (Na⁺ and other electrolytes, Ca⁺⁺, glucose) were abnormal in approximately 6% and are generally ordered as routine practice. When blood or spinal fluid cultures were done on these children, blood cultures were abnormal in at least 2.7%, and a CSF



Brief Summary
GUIDELINE TITLE
 Practice parameter: diagnostic assessment of the child with status epilepticus (an evidence based review).
BIBLIOGRAPHIC SOURCE(S)
 Rivielo JJ, Ashwal S, Hirtz D, Glauser T, Ballaban-Gil K, Kelley K, Morton LD, Phillips S, Sloan E, Shinnar S, American Academy of Neurology Subcommittee, Practice Committee of the Child Neurology Society. Practice parameter: diagnostic assessment of the child with status epilepticus (an evidence based review): report of the Quality Standards Subcommittee of the American Academy of Neurology and the Practice Committee of the Child Neurology Society. Neurology 2006 Nov 14;67(10):1542-50. [44 references listed].
GUIDELINE STATUS
 This is the current release of the guideline.
BRIEF SUMMARY CONTENT
RECOMMENDATIONS
EVIDENCE SUPPORTING THE RECOMMENDATIONS
IDENTIFYING INFORMATION FOR PRACTICE
GOALS
MAJOR RECOMMENDATIONS
 Definitions of the strength of the recommendations (A, B, C, U) and classification of the evidence (Class I through Class IV) are provided at the end of the "Major Recommendations" field.
Laboratory Studies
Should Blood Cultures and Lumbar Puncture (LP) be Routinely Done in Children with Status Epilepticus (SE)?
 Recommendations
 1. Insufficient data to support or refute whether blood cultures should be done on a routine basis in children with SE when there is no clinical suspicion of infection.


Know Your Clinical Options

- Know if your institution has a policy or guideline that directs your care
- Know what meds are available to you, and how to get them to the pt
- Know your consultants, and how to get a hold of them
- Know when & how to get an EEG done

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A Proposed Protocol

- 0-20 min: Initial evaluation and benzos
- 20-40 min: Fosphenytoin infusions
- 40-60 min: Phenobarbital or valproate infusions (levetiracetam?)
- 60-90 min: Continuous infusion AEDs
- 90-120 min: CT, neuro consult
- 120-150 min: ICU, EEG monitoring

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Treat Efficiently & Effectively

- Look at the clock, watch time go by
- Know what therapies you will use
- Use therapies serially
- Order and plan therapies in parallel
- Make the seizure stop

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Education

Handheld Software: SeizureStat®

SeizureStat® Available free from www.ferne.org

- Written at University of Illinois, Chicago
- Funded by FERNE
- Written materials
- Urgent SE protocol
- Information on 10 urgent meds



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Therapy Administration

- Order one medication
- Deliver the medication
- Order the next medication while administering the first one
- Repeat
- Make the seizure stop



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Document Well: Medical

- Seizure history? Medical History?
- Partial seizure onset (aura)?
- Generalized seizure activity?
- AMS, post-ictal?
- Trauma? Toxins? Pregnancy?
- Neurological exam? Repeat exam?
- Family, PMD, EMS?

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Document Well: Systems

- How was secondary injury prevented?
- How did your consultants assist you?
- How did you get your medications?
- How was AMS / coma addressed?
- How were CT, EEG quickly obtained?
- How was disposition optimized?

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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 x 2
- 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 recent illness, trauma, EtOH
- No medic alert bracelet

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Patient Outcome

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

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Conclusions

- Status epilepticus: medical emergency
- Take a surgeon's approach to Rx
- Know the disease and your options
- Guidelines exist that facilitate practice
- Utilize a treatment protocol
- Address the medical, systems issues
- Optimize SE patient outcomes

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Questions?

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