



**Practice Guidelines:
Development and Applications to
Clinical Decision Making**

**A Focus on Seizures and Status
Epilepticus: Key Learning Points**

Ponte Vedra, Florida

June 21, 2003

**Overview of Practice Guidelines
William Dalsey, MD, MBA**

How do you create a Clinical Guideline?

1. The best review of the general principles for clinical guideline development may be the series of articles in JAMA written by David Eddy. He has also written a book on the subject called *Clinical Decision Making: From Theory to Practice*, Jones and Bartlett 1996. In the writings he emphasizes the need for open communication of the members creating the guidelines, their process and criteria for evaluating and using literature, establishing criteria for the strength of recommendations and honest communication of when consensus is used.
2. ACEP's Clinical Policy Committee has published their process for creating Clinical Policies and our grading system for evaluating the literature in the *Annals of Emergency Medicine*, but it is also available on our website. We have begun using critical clinical questions to focus our clinical policies on key areas. This allows for easier literature searches and the creation of better evidence tables.
3. The topics selected for clinical guidelines may be generated from interested physicians, attempts by other physician groups to dictate care in the ED without using an appropriate evidence-based approach, frequency or severity of clinical problems, and development of new diagnostic or therapeutic interventions.
4. We use a subcommittee process that allows us to have members from the main clinical policy committee that are familiar with our process and format, as well as seeking experts to participate from outside the committee.
5. One of the most important aspects to successfully creating a useful clinical guideline is to make sure that the key clinical questions are appropriately designed to facilitate a literature search and determining an answer. The existence of Clinical

Guidelines in the area you have chosen can be identified by using the databases of clinical policies available on the web. (ie. www.guideline.gov and Cochrane Library) Experts can identify key articles on the topic area, and their bibliographies may be valuable. Almost everyone performs a computerized search of the medical literature. This can be more difficult than it might appear. Broad searches frequently identify more articles than can be reviewed and narrow searches can miss key articles that need to be included.

6. When possible the best scientific evidence comes from prospective randomized controlled clinical trials. Meta-analysis and other statistical techniques can be used to combine the results of several small trials to answer some questions. However, many clinical questions can't be adequately answered by the existing literature. In these cases it is necessary to clearly state that the literature does not provide an answer or to clearly indicate when expert consensus is used to provide an answer.

Types of Guidelines

Andy Jagoda, MD

1. All guidelines are not the same; methodology used to develop the guideline must be assessed.
2. Consensus guidelines are the easiest to write but are of limited value due to bias which may impact the guidelines development.
3. Evidence based guidelines are theoretically the most valid type of guideline.
4. Evidence based guidelines must utilize well-defined outcome measures in answering the questions asked and the evidence must be systematically reviewed and graded.

Clinical Guidelines:

Do they make a difference in practice?

J. Stephen Huff, MD

1. What are the goals in creating clinical guidelines and in what scenarios are they likely to be of use?

The goals of clinical guidelines are admirable with improved efficiency, decreased variation, safe practice environments, patient safety, and monetary savings all targets. Clinical scenarios where guidelines are likely to be useful include infrequent clinical events with poor outcomes and clinical problems where there is diagnostic or therapeutic uncertainty.

2. What factors deter clinicians from not using guidelines?

Many clinicians voice concerns that guidelines may not apply to an individual patient. Other reasons cited for lack of guideline use include physician unawareness, specialty-specific formulation ("turf"), and lack of need for a guideline with a specific problem.

3. What are some examples of guidelines for common clinical guidelines?

ACLS and the Ottawa ankle rules are cited as examples of guidelines that are often followed likely because they fulfill clinical needs. Traumatic brain injury guidelines and migraine guidelines have been found not to be followed by emergency physicians for a variety of reasons.

4. How can physician behavior be changed?

Each clinical scenario should be examined to identify likely reasons for noncompliance. Didactic presentations have been shown to be ineffective in changing physician behavior. Performance feedback with both positive and negative rewards is advocated to effect change.

**The Use of Clinical Guidelines for Educational
Efforts in the Academic Setting**

Edward P. Sloan, MD, MPH

1. All lectures regarding clinical care that are given to Emergency Medicine residents and faculty should utilize evidence-based clinical guidelines.
2. The search of the medical literature and internet should include the following steps:
 - a. Search the medical literature using MEDLINE/PubMed.
 - b. Perform an internet search using www.google.com or another search engine.
 - c. Look at the websites for foundations relevant to your clinical topic.
 - d. Look at the websites for physician organizations that are relevant to your topic.
 - e. Determine if guidelines are available at www.guidelines.gov.
 - f. Search for Cochrane library reviews using www.update-software.com.
 - g. Find cases and radiographs using radiology teaching files.
3. The educational experience can be maximized by providing content in the following way:
 - a. Utilize journal club articles to direct individual learning off-line.
 - b. Make the lecture available via the internet using videostreaming technology.
 - c. Provide the content via CD-ROM or the internet using PDF files.
4. Inform the learners as to how you conducted your search and what publications and websites were utilized so that they can do similar work when they present a lecture.
5. Please examine the FERNE website at www.FERNE.org for relevant examples.

**Evaluation of the ED Patient with a
First Time Seizure**

Andy Jagoda, MD

1. Patients with a first time seizure with no co-morbidities should have a serum glucose, electrolytes; women of child bearing age should have a pregnancy test. Patients with co-morbidities should be considered for more extensive metabolic profiling. (Class II and Class III evidence)
2. Patients with a first time seizure should have a noncontrast head CT in the emergency department. (Class II evidence; no outcome data to support recommendation)
3. Patients with a first time seizure with HIV should have a lumbar puncture either in the ED or after admission to the hospital. (Class II data)
4. Patients with a first time seizure who have a normal head CT, glucose and electrolytes, and normal neurologic examination can be safely discharged from the ED on no AED therapy. (Class III data)
5. AED therapy has potential complications and risk of recurrence is multifactorial; initiation of AED therapy is best reserved for the physician who will assume primary care of the patient. (Class III data)

**Oral Versus Intravenous Loading of Anticonvulsants
Edwin Kuffner, MD**

1. No well designed study has addressed the short term rate of seizure recurrence and the short term rate and severity of adverse events by directly comparing any of the common contemporary dosing strategies used to treat a patient with who presents to the emergency department after having had a seizure with a "subtherapeutic" phenytoin level. A serum phenytoin level ≥ 10 mg/L can be achieved by all of the common contemporary dosing strategies including intravenous loading, oral loading and starting/restarting oral maintenance dosing.
2. Fewer adverse local effects (phlebitis, purple glove syndrome and tissue necrosis) and fewer adverse systemic effects (impairment of myocardial contractility, dysrhythmias, hypotension and cardiac arrest) are associated with intravenous fosphenytoin administration when compared to intravenous phenytoin administration.
3. This difference in adverse effects between parenteral phenytoin and fosphenytoin is believed to be in part related to the fact that parenteral phenytoin preparations contain propylene glycol (40%) and ethanol (10%) and are adjusted to a pH of 12. Fosphenytoin which is more water soluble does not contain these same diluents and has a more physiologic pH of 8.6 to 9.
4. Fosphenytoin is significantly more expensive than intravenous phenytoin.

First Line Therapy in Acute Seizure Management
William Dalsey, MD, MBA

1. Use a benzodiazepine as the first-line therapy.
2. If there is no IV access consider IM versed or fosphenytoin, or rectal valium.
3. Lorazepam is the preferred first line agent for seizure control due to its long lasting anticonvulsant properties.
4. Diazepam is equally effective but requires that a concomitant, long acting AED be administered (ie Dilantin).
5. When the IV access is unavailable, alternate routes such as IM injections of midazolam, rectal solutions of diazepam, and IM fosphenytoin should be considered; of the three, IM midazolam is probably the fastest and easiest to use.

**Emergency Department Management of Patients with
Seizures and SE: The Role of Therapies Utilizes
After Initial Benzodizepine Therapy
Edward P. Sloan, MD, MPH**

1. There is good data to support the initial use of benzodizepines in ED patients with seizures and SE. Both lorazepam and diazepam are useful IV agents, with slightly different characteristics that guide ED use.
2. The phenytoins are a useful second agent for use in ED SE patients. Factors such as the need for a rapid infusion, safety, the need for IM use, and cost will guide the ED physician in selecting fosphenytoin over phenytoin. Both may be useful in doses up to 30 mg/kg in SE patients.
3. Phenobarbital and valproate may be useful for the treatment of ED SE patients who are refractory to the benzodiazepines and phenytoins, as well as in pediatric patients.
4. Propofol can be utilized to achieve burst suppression in refractory SE patients, as can an IV midazolam infusion.

Status Epilepticus Classification and Emergent EEG Use in The Emergency Department

J. Stephen Huff, MD

1. What is status epilepticus?

Typically status epilepticus is defined as 30 minutes of continuous seizure activity or a series of seizures without return to full consciousness between the seizures. Many feel that pathophysiologic studies suggest that a shorter period of seizure activity causes neuronal injury and suggest 20 minutes or briefer times define status epilepticus. A consensus panel states that aggressive treatment for generalized convulsive status epilepticus should be initiated when a seizure has persisted 10 minutes and further states that patients still seizing on arrival to the emergency department should be aggressively treated. There is controversy in the term "nonconvulsive status epilepticus" (NCSE). Currently, nonconvulsive status epilepticus is best reserved for absence status epilepticus and partial complex status epilepticus. The term "subtle status epilepticus" is more correctly used to indicate patients that have evolved from generalized convulsive status epilepticus or are in a comatose state with epileptiform activity.

2. Why is status epilepticus a medical emergency?

Generalized tonic-clonic (GTC) status epilepticus injures the brain even if acidosis, ventilation, and hemodynamic factors are controlled. Studies indicate that the longer GTC status continues, the less likely it is to terminate spontaneously. Secondary complications may further injure the brain.

3. When is an EEG indicated in the emergency department?

Recommendations have been made to obtain emergency EEG for persistent altered consciousness, refractory status epilepticus, pharmacologically managed sedation and coma, and for the diagnosis of viral encephalitis as well as for a variety of other clinical conditions including coma and brain death. The most compelling argument for emergent EEG is for the detection of generalized convulsive status epilepticus that may have evolved into subtle status epilepticus with continuing abnormal electroencephalographic discharges. In spite of

recommendations, a recently published multicenter survey of management of patients with seizures revealed that EEG was uncommonly performed in ED's and only rarely in the ED for the indication of status epilepticus. A survey of medical directors of accredited North American clinical EEG laboratories and directors of facilities offering accredited EEG fellowships revealed that the majority of facilities required neurologic consultation or other specialized consultation before emergent EEG could be obtained.

In spite of recommendations, no clear guidelines mandate EEG use by emergency physicians. Neurologic consultation is the pathway for assistance in problematic cases.