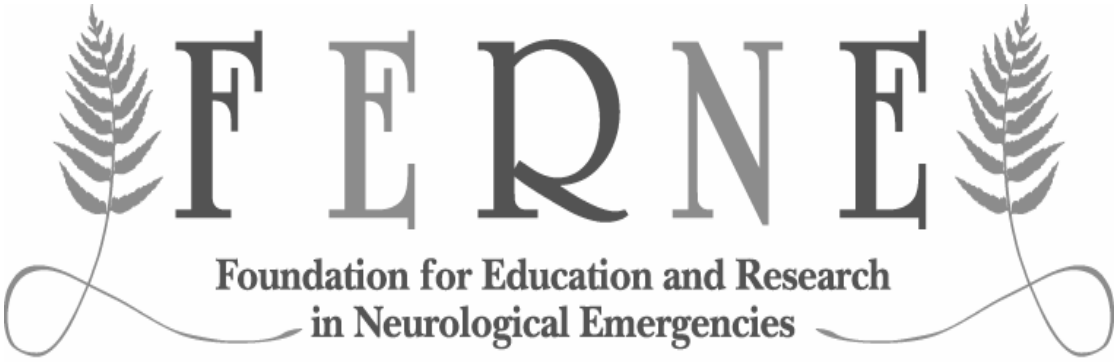

ACEP Clinical Policy: Critical Issues for the Evaluation and Management of Adult Patients Presenting With Seizures

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Introduction

Emergency physicians frequently treat seizure and status epilepticus (SE) patients in the Emergency Department (ED). In order to improve the care of these patients, the American College of Emergency Physicians (ACEP) recently published an ED seizure clinical policy that utilized six critical clinical questions.[1] Three of the questions address the diagnosis, management, and disposition of new-onset seizure patients in the ED. The remaining three questions address phenytoin loading, anti-epileptic drug (AED) therapies in ED seizure patients who are refractory to initial benzodiazepine and phenytoin therapies, and the indications for urgent EEG monitoring. These questions and their corresponding recommendations are designed to allow emergency physicians to better understand what options exist in managing ED seizure patients optimally.

ACEP Clinical Policies: A Primer

Clinical policies are designed to distinguish evidence-based practice from opinion-based practice, and as such they have the potential to improve clinical decision-making, enhance medical education, and reduce medical liability. These guidelines also have the potential to optimize health care by providing consistency as patients are diagnosed and treated. Furthermore, clinical policies have the capacity to improve resource utilization, minimize cost, and help to identify areas in need of future research.

The ACEP clinical policies committee was formed in 1987. Following initial consultation with Dr. David Eddy, the grandfather of the clinical policy movement in this country, ACEP's clinical policy development utilized a formal consensus approach by a panel of emergency physicians representing different regions of the country. Using insurance claim data to identify ED chief complaints that were either frequently seen, high risk, or costly, a symptom-based policy process was established. The first ACEP clinical policy on chest pain was published in 1991. This consensus approach reflected the committee member's best guess as to what they thought best practice should be when managing chest pain patients in the ED. This first clinical policy was, however, potentially biased, given that it lacked a defined analytic procedure for incorporating the relevant medical literature. The first clinical policy on seizures, which was published in 1993, also did not fully integrate a systematic approach in evaluating what the medical literature tells us is a best clinical practice.[2] As more clinical policies have been developed, including the revision of the seizure clinical policy in 1997, the clinical policies committee has moved toward a more evidence-based process for their development, including standards for the evaluation and integration of published clinical studies into the formal policy recommendations.

Clinical Policy Committee Methodology

The clinical policy committee develops questions that are relevant to a specific disease state or area within Emergency Medicine. A subcommittee is then formed that includes members of the clinical policy committee as well as experts in the clinical area being addressed by the clinical policy. Relevant clinical studies from the medical literature are then selected, reviewed and then graded using predetermined criteria.

Class I studies have utilized optimal randomized, controlled research design methodology, and provide data that supports Level A recommendations, those with

the highest degree of clinical certainty. Class II studies are more often non-randomized, but have utilized methods that allow Level B recommendations to be made, those that reflect moderate clinical certainty. Class III studies, which include case series as well as consensus documents, allow the generation of Level C recommendations, which reflect treatment strategies that are to be considered given their possible, but not clearly proven, effectiveness. For all of the reviewed articles, there is a process by which the article can be downgraded based on design flaws, causing the corresponding recommendation level also to be reduced. Of note is the fact that these ACEP clinical policies are to be applied only to hospital-based emergency physicians.

The ACEP Seizure Clinical Policies

The initial 1993 ACEP seizure clinical policy focused on the evaluation and treatment of known alcohol-related seizures. A consensus approach emphasized the initial stabilization of patients with life-threatening seizures, including oxygenation and airway control, hypoglycemia identification and treatment, and clinical observation. Little guidance was offered to clinicians, but the consensus document did support a diagnostic evaluation based on vital signs, physical examination, and a neurological examination designed to detect focal deficits. This policy did not require extensive diagnostic studies as part of the treatment paradigm. The 1997 revision of this seizure clinical policy used a more formal consensus approach and a systematic literature review. This policy also expanded the seizure guideline to include patients with known seizure disorders.

The 2004 revision of the ACEP seizure clinical policy was based fully on an evidence-based approach as it answers six clinically relevant questions regarding the treatment of seizure and SE patients in the ED. A computerized search was completed to identify pertinent medical literature and references related to acute management of patients with seizures. The articles were then graded according to their methodology, size, potential biases, and the reliability of the data collection and analysis. Finally, in order to validate committee conclusions and make their application more robust, the seizure clinical policy was submitted to selected experts and relevant specialty societies for peer review and revision prior to its final publication in May 2004.

The Six Clinical Questions From the 2004 ACEP Seizure Clinical Policy

The following six questions are addressed in the ACEP seizure clinical policy. Three questions address issues related to patients who present with new-onset seizures, and three address other issues related to the diagnosis and treatment of patients who present with seizures or are in status epilepticus.

Question 1: What laboratory tests are indicated in the otherwise healthy adult patient with a new-onset seizure who has returned to a normal baseline neurological status?

Level B Recommendations:

1. Determine a serum glucose and sodium level on patients with a first time seizure with no comorbidities who have returned to their baseline.
2. Obtain a pregnancy test if a woman is of childbearing age.
3. Perform a lumbar puncture, after a head CT, either in the ED or after admission, on patients who are immuno-compromised.

When examining the necessity of doing laboratory testing in new-onset seizure patients, the committee attempted to focus on which tests are likely to be abnormal and require some specific acute therapy. Based on studies that examined series of patients who received laboratory tests following a new-onset seizure, the level B recommendations suggest that only routine chemistry testing may be useful, given that hypoglycemia and hyponatremia both can cause seizures to occur. The literature also supports that testing for CNS infection, including CT examination and lumbar puncture, should be considered in the work-up of patients who are immuno-compromised. Of note, however, is the fact that these latter tests for CNS infection need not necessarily be completed prior to hospital admission if the clinical situation precludes their completion.

Question 2: Which new-onset seizure patients who have returned to a normal baseline require a head computed tomography (CT) scan in the emergency department (ED)?

Level B Recommendations:

1. When feasible, perform neuroimaging of the brain in the ED on patients with a first time seizure.
2. Deferred outpatient neuroimaging may be used when reliable follow-up is available.

As was the case with the need for laboratory testing, the committee attempted to determine if neuroimaging needed to be completed given the frequency with which patients with a normal neurological exam would have a CT abnormality that required emergent or urgent intervention. Again, based on data from series that included the results of neuroimaging in new-onset seizure patients, it is recommended that emergency physicians complete a CT scan in the ED when feasible, but that it could be deferred if outpatient testing could be reasonably assured in a timely manner.

Question 3: Which new-onset seizure patients who have returned to a normal baseline need to be admitted to the hospital and/or started on an antiepileptic drug?

Level C Recommendations:

1. Patients with a normal neurological examination can be discharged from the ED with outpatient follow-up.
2. Patients with a normal neurological examination, no comorbidities, and no known structural brain disease do not need to be started on an antiepileptic drug in the ED.

This question addressed an important situation that occurs frequently in every day practice. The purpose of admitting new-onset seizure patients and/or starting them on an anti-epileptic drug (AED) is to prevent these patients from going into status epilepticus (SE) soon after the occurrence of the new-onset seizure. Unfortunately, there is no good epidemiological data that documents the frequency with which new-onset seizure patients will have a recurrent seizure or develop SE soon after their initial ED evaluation. Studies suggest that the rate of recurrent seizures and SE is sufficiently low that it may not be necessary to admit seizure patients for observation or treat them with an AED if they have a normal mental status. As such, those new-onset seizure patients who are at the lowest risk for a seizure recurrence or developing SE can be considered for discharge without starting an AED based on the level C recommendations contained in this clinical policy.

Questions 4: What are effective fosphenytoin or phenytoin dosing strategies for preventing seizure recurrence in patients who present to the ED after having had a seizure with a subtherapeutic serum phenytoin level?

Level C Recommendation:

Administer an intravenous or oral loading dose of phenytoin or intravenous or intramuscular fosphenytoin, and restart daily oral maintenance dosing.

This clinical question addresses a clinical scenario that is frequently encountered in the ED. Commonly, seizure patients are brought to the ED because of a seizure that is related to non-compliance with oral phenytoin maintenance therapy. The goal of phenytoin loading is to provide a therapeutic level in a safe, expedient, and cost-effective manner. Oral loading, while quick and efficient, could be associated with more frequent seizure recurrence if therapeutic levels are achieved in a delayed or inconsistent manner. Parenteral phenytoin or fosphenytoin loading can be less efficient than oral loading in the ED, but the parenteral route, because it achieves a therapeutic phenytoin level most consistently, could reduce the risk of a recurrent seizure or SE. Because all of the above strategies have been found to be safe and effective in various studies, the committee provided a level C recommendation that a loading dose of phenytoin (intravenous or oral) or fosphenytoin (intravenous or intramuscular) could be completed in the ED prior to starting daily oral maintenance after ED discharge.

Question 5: What agent(s) should be administered to a patient in status epilepticus who continues to seize after having received a benzodiazepine and a phenytoin?

Level C Recommendation:

Administer one of the following agents intravenously; “high dose phenytoin”, phenobarbital, valproic acid, midazolam infusion, pentobarbital infusion, or propofol infusion.

The ACEP policy committee considered the situation in which a patient fails to respond to initial treatment with a benzodiazepine or a phenytoin, and is considered to be in SE. There exist few randomized studies that address the optimal management of SE patients; instead, there are only case series that suggest that different therapies can be effective in treating patients who fail to respond to these two classes of AEDs. Although there are clinical situations in which each individual therapy may be superior to another in terminating a prolonged seizure, there is no data that suggests that any one therapy is uniformly superior to another. As such, there exists only a Grade III recommendation that one of the following agents be administered intravenously: “high-dose phenytoin” (fosphenytoin or phenytoin at 30 mg/kg), phenobarbital, or valproic acid, or infusions of midazolam, pentobarbital, or propofol.

Question 6: When should electroencephalographic (EEG) testing be performed in the emergency department?

Level C Recommendation:
Consider an emergent EEG in patients suspected of being in non-convulsive status epilepticus or in subtle convulsive status epilepticus; patients who have received a long acting paralytic, or patients who are in a drug-induced coma.

When considering this question, the committee understood that EEG testing is infrequently obtained in the ED, in part because it is not often clinically indicated, and also because it is not offered on a 24/7 basis in most institutions. Despite the fact that EEG monitoring is not frequently requested by emergency physicians, it is still important to know when it should be ordered either as a stat ED test or upon ICU arrival. There are two clinical situations identified in the committee's level C recommendation when EEG monitoring should be considered. The first is when non-convulsive or subtle SE is possible because of a prolonged comatose state. The second is when it is no longer possible to determine if a seizure is occurring clinically, either because the patient has received a paralytic prior to rapid sequence intubation or because the patient is in an induced coma. The goal in this situation is to order an EEG when it is possible that electrical seizure activity requires additional AED therapy despite the absence of clinically apparent motor seizure activity.

Conclusions

In developing the recommendations for these six clinically important questions, the ACEP clinical policy committee attempted to improve the care of patients with seizures and SE in the ED. It is interesting to note that despite the publication of thousands of studies related to seizures and SE, the literature only supports level B recommendations for the laboratory and neuroimaging of new onset seizures, and that the other four questions could only be supported by level C recommendations. This suggests that emergency physicians must be aware of their options when treating these patients, and that the care of each patient be individualized in order to maximize the chance of having a good outcome.

References

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