

Neuroimaging in the Emergency Department Patient Presenting with a Seizure

Exploring the ACEP/AAN Practice Parameter

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1

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Disclosures

- None


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Key Clinical Question

- What is the optimal clinical approach to neuroimaging a seizure patient based on the ACEP practice parameter?

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A Clinical Case

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Patient EMS Data

- 63 yo male
- First time Generalized tonic-clonic seizure witnessed by spouse
- Chicago Fire Department
- Post-ictal on arrival of EMS
- EMS to ED

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Patient Clinical History

- Meds: Accupril, Sildenafil
- Pmhx: Hypertension, Sexual Dysfunction
- Social Hx: no tobacco, EtOH, or illicit drug use
- Married

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ED Presentation

- Awake, alert and oriented
- Normal vital signs
- Neurologically intact
- Bedside Glucose 119

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Why Consider This Case?

- First time seizure
- Few hospitals utilize a seizure protocol
- Protocol improves patient outcome
- Guidelines exist that facilitate practice

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Practice Parameter

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Recommendation Strength

- **Standards:** High degree of clinical certainty
- **Guidelines:** Management Strategies
- **Practice Parameters:** Specific recommendations from a scientifically based analysis

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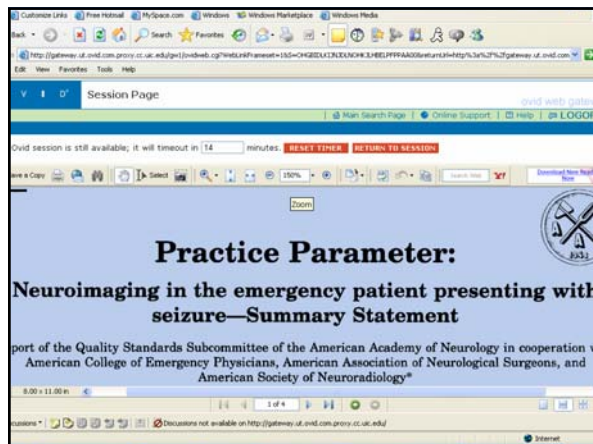

Exploring the ACEP/AAN Practice Parameter

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Joint Project

- American College of Emergency Physicians (ACEP)
- American Academy of Neurology (AAN)
- American Association of Neurological Surgeons (AANS)
- American Society of Neuroradiology (ASN)


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Methods

- MEDLINE search
- Primary modality : CT
- Excluded Status Epileptics


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Data Elements

- Age Stratification
- Likelihood of abnormal CT
- Types of CT lesions
- Outcome data


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Co-variables

- First Seizure
- Seizure Type
- Signs of CNS infection
- Persistent altered mental status
- Recent trauma


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Co-variables

- Meningismus
- New Focal Abnormality
- History of anticoagulation
- Immunosuppression
- Malignancy
- Headache

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Consensus : Need and Urgency of Neuroimaging

- **Emergent:** Timely decision for potentially life-threatening entities
- **Urgent :** Timely appropriate clinical disposition
- **Routine:** Indicated for management but not disposition

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Evidence Levels

- **Class I:** Randomized controlled clinical trials,
- **Class II:** Clinical Studies (Case-control, Cohort)
- **Class III:** Expert opinion, case report

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Practice Parameter: Recommendations Neuroimaging

- Usefulness
- Timing
- Utility



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First Time Seizure

- **Emergent Neuroimaging:**
 - Suspect structural lesion
 - New focal deficits, Persistent altered mental status, fever, trauma, headache, cancer, anticoagulation, HIV/AIDS
 - Age over 40
 - Partial-onset seizure

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First Time Seizure

- **Urgent Neuroimaging:**
 - Completed recovered & no identifiable cause
 - Hypoglycemia
 - Hyponatremia
 - TCA overdose

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Epilepsy with Recurrent Seizure (s)

- **Emergent Neuroimaging :**
 - Suspect structural lesion
 - New focal deficits, Persistent altered mental status, fever, trauma, headache, cancer, anticoagulation, HIV/AIDS
 - New seizure type or pattern
 - Prolonged postictal confusion
 - Worsened mental status

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Epilepsy with Recurrent Seizure (s)

- **Urgent Neuroimaging:**
 - Completed recovered & no identifiable cause
 - Hypoglycemia
 - Hyponatremia
 - TCA overdose

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Febrile Seizure

- Unlikely to have structural lesion
- Emergent or Urgent NI not indicated

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Typical Recurrent Seizure

- Unlikely to have structural lesion
- Emergent or Urgent NI not indicated

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Future Research

- Patient outcomes
- Therapeutic impact
- NI in diagnostic modalities
- Changing role in era of advancing technologies

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ED Patient Outcome

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ED Patient Management

- Brain computed tomography : normal
- Serum Electrolytes : normal
- Additional history: 3 hours after taking sildenafil for first time, tonic-clonic seizure
- Unremarkable ED course
- Discharge with outpatient follow-up
- Subsequent MRI, EEG, carotid doppler negative

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Conclusions

- ACEP practice parameter defines role and timing of NI in emergency management of seizures
- Based upon Class II and III evidence
- Timing classifications: emergent, urgent, routine, and not indicated
- Unenhanced CT scan preferred modality

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Recommendations

- Emergent Neuroimaging:
 - Suspicion for structural lesions
 - Age greater than 40
 - Partial-onset seizure
 - New seizure type or pattern
- Urgent Neuroimaging:
 - No identifiable cause & complete recovery
 - Prior to disposition if follow-up not assured

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Commentary

- What does the clinical guideline really tell us?

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Commentary

- Is the guideline clinically relevant?

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Commentary

- How could the guideline be enhanced?
- Is there literature out there that could really answer the question in a clinically useful manner?
- If not, how can questions such as this be answered?

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Questions?

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