Critical Review Form
Prognosis

Emergency brain computed tomography in children with seizures: Who is most likely to benefit? *J Pediatrics* 1998; 133: 664-669

Objective: **"To investigate whether CT imaging had contributed to the management of new-onset seizures and to identify risk factors associated with CT scan abnormalities that required intervention". (p.665)**

Methods: **Retrospective review of all children without a history of neurologic illness presenting to Children's National Medical Center ED (Washington, DC) between July 1993 – June 1994 who had a CT. These patients were identified by DRG's and a review of the CT-imaging log book excluding children with previously diagnosed neurologic disorder (cerebral palsy, VP shunt), systemic disorder (hepatic/renal failure, lupus), malignancy, or neurocutaneous disease. Additionally, children ages six months to five years with febrile illness were excluded, along with seizures lasting less than 20-minutes with a normal postictal neurological exam.**

Data abstraction included age, antecedent factors, episode duration, postictal neurologic exam, labs, CT findings and MRI-findings up to six months after the seizure. Children were then divided into groups based upon whether they had a provoked seizure (febrile seizure anoxia, trauma, vaccine) or unprovoked seizure (history and lab revealed no precipitating factor). Information obtained by CT was considered to have contributed to the management of the seizure if the child received either further investigation or treatment because of the CT scan abnormality.

Guide		Comments
I.	**Are the results valid?**	
A.	**Was the sample of patients representative?** *In other words, how were subjects selected and did they pass through some sort of "filtering" system which could bias your results based on a non-representative sample. Also, were objective criteria used to diagnose the patients with the disorder?*	• 107 children with first seizure had a CT scan while in the ED. • Electrolytes were measured in all children. • LP was performed in 64% • Eight episodes were not considered to be seizures. • No population demographics or disposition details are provided.
B.	**Were the patients sufficiently homogeneous with respect to prognostic risk?** *In other words, did all patients share a similar risk from during the study period or was one group expected to begin with a higher morbidity or mortality risk?*	• 49/99 (49%) had a provoked seizure. • 50/99 (51%) had an unprovoked seizure with mean age 5-years (median 3 years).
C.	**Was follow-up sufficiently complete?** *In other words, were the investigators able to follow-up on subjects as planned or were a significant number lost to follow-up?*	Retrospective review up to 6-months post-seizure.
D.	**Were objective and unbiased outcome criteria used?** Investigators should clearly specify and define their target outcomes before the study and whenever possible they should base their criteria on objective measures.	"All CT scans were read by 1 of 2 pediatric neuroradiologists" (p.665). Both of these radiologists are authors on this paper, but the investigators fail to state whether outcome assessors were blinded to clinical findings so the potential for *ascertainment bias* exists. Investigators also do not state who abstracted chart information and whether these individuals were blinded to the CT-results or study hypothesis. Finally, the CT-findings may have been available in some cases before the physical exam was documented which could bias identification or documentation of physical exam findings.

II.	What are the results?	
A.	**How likely are the outcomes over time?**	• 19/99 (19%) of children with a seizure had an abnormal CT of which 7 required further intervention. • 9/49 (18%) of children with a provoked seizure had CT scan abnormalities, though none required intervention for the abnormalities detected. • 10/50 (20%) of children with an unprovoked seizure had CT abnormalities detected and 7 required further investigation or treatment. • Among **focal seizures** 11/37 (30%) had CT abnormalities and 5 required further treatment. In contrast 8/62 (13%) with generalized seizures had CT abnormality of which 2 required further therapy. • 20 children had an abnormal neuro exam and 5/20 (25%) had an abnormal CT scan. • 33 children had MRI at 6-months and none of the 11 new findings required medical or surgical intervention. • Unprovoked seizures, focal seizures, and postictal abnormal neuro exam patients are more likely to have clinically significant abnormal CT findings.
B.	**How precise are the estimates of likelihood?** *In other words, what are the confidence intervals for the given outcome likelihoods?*	No Confidence Intervals are provided.
III.	**How can I apply the results to patient care?**	
A.	**Were the study patients and their management similar to those in my practice?**	No population demographics or management breakdown is provided, so we remain uncertain about this study's external validity.

B.	**Was the follow-up sufficiently long?**	Yes, six months.
C.	**Can I use the results in the management of patients in my practice?**	Perhaps as a way to balance the risk-benefit discussion with concerned parents and maximize the yield from CT.

Limitations:

1) **No reference to chart review methods.**

2) **No statistical analysis or Confidence Intervals presented.**

3) **No population demographics or management analysis by which to compare patient populations.**

4) **Single center analysis with limited external validity.**

Bottom Line:

Clinically significant CT abnormalities are more likely in neurologically intact childhood seizure patients with unprovoked seizures, focal seizures, or abnormal postictal neuro exam. However, if the history is difficult to obtain, neurologic exam is suboptimal or follow-up cannot be assured, pre-discharge CT scanning may be advisable.