Interobserver Agreement in the Assessment of Clinical Findings in Children With First Unprovoked Seizures

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Interobserver Agreement in the Assessment of Clinical Findings in Children With First Unprovoked Seizures

WHAT’S KNOWN ON THIS SUBJECT: Few data are available to determine whether clinicians practicing in acute settings assess children with first-time seizures in a similar way. This is important for the study of clinical predictors potentially associated with intracranial abnormalities in these children. In particular, findings such as seizure focality are often used to determine the need for emergent and nonemergent neuroimaging.

WHAT THIS STUDY ADDS: Among patient history and physical examination findings, interobserver agreement beyond chance was consistently substantial only for the seizure specific history. Those clinical variables that have been associated with the presence of intracranial abnormalities and show reliability between assessors, such as seizure focality, may be more useful than other predictors in the emergency department assessment of children with first unprovoked seizures.

OBJECTIVES: Variables used in prediction rules and clinical guidelines should show acceptable agreement when assessed by different observers. Our objective was to determine the interobserver agreement of patient history and physical examination variables used to assess children undergoing emergency department (ED) evaluation for a first seizure not provoked by a known precipitant such as fever or trauma (ie, an unprovoked seizure).

METHODS: We conducted a prospective cohort study of children aged 28 days to 18 years evaluated for unprovoked seizures at 6 tertiary care EDs. We excluded patients if previously evaluated for a similar event. Two clinicians independently completed a clinical assessment before neuroimaging. We determined agreement for each clinical variable by using the unweighted $\kappa$ statistic.

RESULTS: A total of 217 paired observations were analyzed; median patient age was 53.5 months, and 38% were younger than 2 years. Agreement beyond chance was at least moderate ($\kappa \geq 0.41$) for 21 of 31 (68%) variables for which $\kappa$ could be calculated. $\kappa$ was $>0.41$ for 7 of 11 (64%) general history variables, all 8 seizure-specific history variables (including seizure focality), and 6 of 12 (50%) physical examination variables. Agreement beyond chance was substantial or better ($\kappa \geq 0.61$) for 2 of 11 (18%) general history variables, for 5 of 8 (63%) seizure-specific history variables, and for 2 of 12 (17%) physical examination variables.

CONCLUSIONS: For children with first unprovoked seizures evaluated in the ED, clinicians frequently assess findings from seizure-specific history with substantial agreement beyond chance. Those clinical variables that have been associated with the presence of intracranial abnormalities and show reliability between assessors, such as seizure focality and the presence of any focal neurological finding, may be more useful in the ED assessment of children with first unprovoked seizures. Pediatrics 2011;127: e1266–e1271
Annually, 25,000 to 40,000 children in the United States experience a first seizure that is not associated with a readily apparent precipitant such as fever or trauma (ie, an unprovoked seizure).1–3 Findings from the patient history and physical examination have been suggested to guide clinicians in the decision to obtain emergent or urgent neuroimaging in these children to detect clinically important intracranial abnormalities.1,4,5 There is little information, however, to support these suggestions. For clinical predictors to guide clinical management, they must both accurately identify those with clinically important intracranial abnormalities and demonstrate substantial agreement between clinician assessors. Few data are available, however, to determine if the clinical predictors potentially associated with intracranial abnormalities in children with first-time seizures are assessed similarly between clinicians in the acute setting. Our aim was to determine the interobserver reliability of clinical history and physical examination findings in children undergoing emergency department (ED) evaluation after first, seemingly unprovoked seizures.

**METHODS**

**Study Design**

We performed a multicenter, prospective cross-sectional study as part of a larger cohort trial aimed to assess the risk of clinically important intracranial abnormalities in children with seemingly unprovoked first seizures who present to the ED.

**Setting and Population**

The study was conducted between March 2005 and September 2007 at 6 urban, academic pediatric EDs in the United States with annual patient volumes ranging from 25,000 to 75,000. Four participating sites were part of the Pediatric Emergency Department Northeast Team node of PECARN (Pediatric Emergency Care Applied Research Network).6 The study was approved by each center’s institutional review board. We obtained written informed consent for participation at sites where required by the local institutional review board.

For the full cohort study, children aged 28 days to 18 years were potentially eligible if a first seizure was believed to have occurred. Children were excluded if there was a known precipitant of the seizure, including substantial trauma (eg, with loss of consciousness) or fever (>38.0°C) within the previous 24 hours, toxin ingestion or exposure, or obvious metabolic disease. Children were also excluded for any of the following: clear syncopal episodes or breath-holding spells, altered mental status without an overt history of a seizure, neurological disorders that substantially impede neurological examination (eg, severe cerebral palsy), or the patient was transferred to the ED with neuroimaging already completed. The patients in the present study constituted a convenience sample of those enrolled in the cohort study, when 2 clinicians were available to perform independent patient evaluations.

**Study Protocol**

The first clinician assessor (faculty physician, fellow, resident, nurse practitioner, or physician assistant) performed a history and physical examination and recorded his or her findings on a structured case-report form. A second clinician performed an independent evaluation within 30 minutes of the first assessor, recording the or her findings on a similar case-report form, masked to the first assessor evaluation. The second assessor was told to obtain the patient’s information from the same historian and to make sure the first assessor believed that the physical examination had not changed substantially since the first examination. Both clinical assessors were asked to complete the physical examination, when possible, after the postictal phase or after the patient awakened from the sedative effects of any medication administered, and before knowledge of cranial computed tomography (CT) or MRI results, if obtained. Neuroimaging was performed at the discretion of the treating physician.

We conducted 30-minute instructional sessions before study initiation for attending faculty and fellow physicians to familiarize them with study procedures. Participating resident physicians, nurse practitioners, and physician assistants either received similar training sessions or were trained individually by the faculty or fellows.

Clinicians were categorized on the basis of their highest level of previous medical training (attending, fellow, resident, nurse practitioner, or physician assistant) and their specialty training (pediatrics, pediatric emergency medicine, emergency medicine, family medicine, internal medicine, or other). Irrespective of other medical background, we categorized assessors as pediatric emergency medicine specialists if they were certified in this subspecialty or had engaged in a pediatric emergency medicine fellowship. All residents were trainees in pediatrics, emergency medicine, or family medicine.

**Measurements**

Clinicians assessed specific clinical findings in 4 domains: past and recent medical history, seizure-specific history, general physical examination, and neurological examination. We chose the clinical findings on the basis of an extensive review of the literature and through detailed discussions with...
faculty physicians in pediatric emergency medicine as well as pediatric and adult neurology. We chose clinical findings that had biological plausibility or for which we had a priori hypotheses to be associated with clinically important abnormal neuroimaging findings in children with seemingly unprovoked seizures.1,4,5

We expected that developmental immaturity would make assessment difficult for particular findings from patient history and physical examination in young children. Therefore, we included “preverbal,” “too young to determine,” or “unable to assess” choices on the case-report form for appropriate variables such as the history of headache and the presence of visual abnormalities.

### Data Analysis and Sample Size

To make variables more clinically sensible for use in the ED, all clinical findings were analyzed as dichotomous variables (ie, presence or absence of a finding). For variables assessed by the clinicians in ordinal categories, we created dichotomous categories that clinicians typically use when categorizing severity of seizures. For example, we collected seizure duration as <15 seconds, 15 seconds to <1 minute, 1 to <5 minutes, 5 minutes to <15 minutes, and ≥15 minutes but created dichotomous variables for analysis at clinically sensible cutoff points (<5 or ≥5 minutes and <15 or ≥15 minutes). For medical history, we created “high-risk” and “not high-risk” groups on the basis of the presence of medical illnesses that would predispose the patient to having a new intracranial abnormality that would potentially require an emergent therapeutic or diagnostic intervention (other than electroencephalogram or nonspecific neuroimaging). We defined high-risk medical history as a history of a brain tumor, other neoplasm, stroke, coagulopathy, sickle cell disease, anatomical cardiac defect, or presence of an intracranial ventricular shunt. For each variable, we excluded from the κ analysis any paired observations for which data were missing or at least 1 assessor was unable to determine the presence or absence of the clinical finding.

For each clinical finding, we calculated raw agreement and assessed chance-corrected agreement using the unweighted Cohen κ statistic with 2-sided 95% confidence intervals (CIs).7 The interobserver agreement was categorized on the basis of the κ point estimates as slight (0.0–0.20), fair (0.21–0.40), moderate (0.41–0.60), substantial (0.61–0.80), and almost perfect (0.81–1.0).7,8

We did not conduct formal sample size calculations based on the measurement of interobserver agreement, as this was not the primary aim of the main cohort study. We expected that specific aspects of the physical examination would only rarely be abnormal (eg, cranial nerve findings) in our patient sample, and therefore anticipated that some variables would have high measures of raw agreement but not necessarily high κ statistic values.

### RESULTS

Clinicians performed paired, independent assessments for 217 (46%) of the 475 patients in the entire cohort. Median age of the patients for whom paired assessments were performed was 53.5 months (interquartile range: 11.7–124.0), and 82 (37.8%) were younger than 2 years. The 217 patients were 48% female, 19% Hispanic, 44% white, and 22% black.

Compared with those patients in the full cohort for whom no second assessment was completed, patients with paired assessments were slightly younger (median age: 53.5 vs 62.9 months), less likely to have a CT scan or MRI performed in the ED (60.9% vs 69.1%), and less likely to be hospitalized (28.6% vs 32.2%). The proportion of missing values for the clinical findings from at least 1 assessor ranged from 2.2% to 11.1% (with the highest missing rate being for rapidity of headache onset). In only 41% of the patients were the clinicians able to obtain the seizure-specific history from an adult who witnessed the seizure.

The assessor pairs consisted of 42% faculty or fellow physicians matched with other faculty or fellow physicians, 52% faculty or fellow physicians paired with residents or nurse practitioners, 1% residents or nurse practitioners matched with other residents or nurse practitioners, and 5% had missing data for clinician specialty type. Of the history and physical examination assessments conducted by faculty or fellow physicians, 73%, 23%, 2%, and 2% were performed by specialists in pediatric emergency medicine, pediatrics, emergency medicine, and family medicine, respectively.

The κ statistics are displayed in Table 1 (historical variables) and Table 2 (physical examination variables). Overall, raw agreement was generally high; 100% of the 35 individual or combination findings had >80% and 69% had >90% raw agreement, respectively. For several clinical findings, particularly from the physical examination, very few assessors determined that an individual finding (eg, abnormal motor strength) was present. Agreement beyond chance was at least moderate (kappa ≥ 0.41) for 7 of the 11 (64%) general history variables for which κ statistics could be calculated. All 8 individual or composite seizure-specific history variables showed at least moderate interrater reliability; 5 of 8 (63%) had substantial reliability (κ ≥ 0.61). Agreement beyond chance was fair for general appearance, and 6
of the 10 neurological examination findings (60%) had at least moderate interrater reliability. The presence of any focal neurological finding achieved substantial reliability. κ values could not be calculated for exposure to cysticercosis and for several variables from the physical examination. For these variables, at least 1 of the 2 assessors did not indicate that the finding was present for any patient. All general physical and neurological examination findings had κ values with wide 95% CIs.

To understand the effect on interrater agreement of removing from the analysis patients for whom at least 1 assessor marked “unsure,” “don’t know,” or “unable to assess,” we recalculated reliability for all patients in whom both assessors marked any response (ie, data point was not missing).

### DISCUSSION

In this multicenter study of children with first, seemingly unprovoked seizures, we found that the interobserver agreement beyond chance was at least moderate for several findings from patient history and physical examination; substantial agreement, however, was consistently seen only for the seizure-specific history. Importantly, agreement was moderate or substantial for the presence or absence of focal seizures, predisposing conditions, mental

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**TABLE 1 Interrater Reliability for Findings on General and Seizure-Specific History**

<table>
<thead>
<tr>
<th>Criterion</th>
<th>No. of Evaluable Patients</th>
<th>No. of Patients for Whom at Least 1 Assessor Marked “Unsure,” “Don’t Know,” or “Unable to Assess”</th>
<th>Characteristic Present per First Assessor, n/N (%)</th>
<th>κ (95% CI)</th>
<th>Percent Overall Agreement</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General history</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High-risk medical history&lt;sup&gt;a&lt;/sup&gt;</td>
<td>201</td>
<td>0</td>
<td>3/201 (1.5)</td>
<td>0.80 (0.41 to 1.0)</td>
<td>99.5</td>
</tr>
<tr>
<td>Exposure to cysticercosis</td>
<td>180</td>
<td>28</td>
<td>4/180 (2.2)</td>
<td>Unable to calculate</td>
<td>98.3</td>
</tr>
<tr>
<td>Headache today, before seizure&lt;sup&gt;c&lt;/sup&gt;</td>
<td>115</td>
<td>8</td>
<td>18/115 (15.7)</td>
<td>0.55 (0.36 to 0.75)</td>
<td>86.1</td>
</tr>
<tr>
<td>No headache or headache not rapid onset vs headache of rapid onset&lt;sup&gt;c&lt;/sup&gt;</td>
<td>109</td>
<td>15</td>
<td>5/109 (4.6)</td>
<td>0.47 (0.11 to 0.83)</td>
<td>94.5</td>
</tr>
<tr>
<td>No headache or headache not rapid onset, first or worst vs headache rapid onset, first or worst&lt;sup&gt;c&lt;/sup&gt;</td>
<td>114</td>
<td>5</td>
<td>7/114 (6.1)</td>
<td>0.26 (0.024 to 0.54)</td>
<td>88.6</td>
</tr>
<tr>
<td>History of headaches&lt;sup&gt;c&lt;/sup&gt;</td>
<td>119</td>
<td>7</td>
<td>19/119 (16.0)</td>
<td>0.54 (0.33 to 0.76)</td>
<td>89.1</td>
</tr>
<tr>
<td>No headaches or headaches neither in morning nor more frequent vs previous headaches either in morning or more frequent&lt;sup&gt;c&lt;/sup&gt;</td>
<td>117</td>
<td>7</td>
<td>2/117 (1.7)</td>
<td>−0.028 (−0.06 to 0.004)</td>
<td>91.5</td>
</tr>
<tr>
<td>History of nausea or vomiting</td>
<td>205</td>
<td>4</td>
<td>29/205 (14.1)</td>
<td>0.53 (0.37 to 0.69)</td>
<td>87.8</td>
</tr>
<tr>
<td>Behavior change (sleeping more, less active, more emotional/irritable, unusual conduct/behavior)</td>
<td>210</td>
<td>0</td>
<td>26/210 (12.4)</td>
<td>0.38 (0.20 to 0.56)</td>
<td>85.7</td>
</tr>
<tr>
<td>Speech change&lt;sup&gt;c&lt;/sup&gt;</td>
<td>121</td>
<td>5</td>
<td>1/121 (0.8)</td>
<td>0.66 (0.04 to 1.0)</td>
<td>99.1</td>
</tr>
<tr>
<td>Dizzy, falling, or uncoordinated&lt;sup&gt;c&lt;/sup&gt;</td>
<td>119</td>
<td>3</td>
<td>13/119 (10.9)</td>
<td>0.44 (0.18 to 0.71)</td>
<td>89.9</td>
</tr>
<tr>
<td>Vision change&lt;sup&gt;c&lt;/sup&gt; (acuity, double/blurred vision, other)</td>
<td>114</td>
<td>3</td>
<td>5/114 (4.4)</td>
<td>0.14 (−0.18 to 0.46)</td>
<td>92.1</td>
</tr>
<tr>
<td><strong>Seizure-specific history</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;1 seizure in 24 h</td>
<td>201</td>
<td>7</td>
<td>47/201 (23.4)</td>
<td>0.83 (0.73 to 0.92)</td>
<td>94.0</td>
</tr>
<tr>
<td>Longest seizure in past 24 h</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥5 min</td>
<td>170</td>
<td>29</td>
<td>36/170 (21.2)&lt;sup&gt;d&lt;/sup&gt;</td>
<td>0.80 (0.69 to 0.91)</td>
<td>92.9</td>
</tr>
<tr>
<td>≥15 min</td>
<td>170</td>
<td>29</td>
<td>15/170 (8.8)&lt;sup&gt;d&lt;/sup&gt;</td>
<td>0.78 (0.62 to 0.94)</td>
<td>95.8</td>
</tr>
<tr>
<td>Any focal aspect to seizure&lt;sup&gt;a&lt;/sup&gt;</td>
<td>181</td>
<td>29</td>
<td>62/181 (34.3)</td>
<td>0.58 (0.45 to 0.71)</td>
<td>81.2</td>
</tr>
<tr>
<td>Motor aspect 1-sided at any point</td>
<td>156</td>
<td>40</td>
<td>25/156 (16.0)</td>
<td>0.67 (0.52 to 0.84)</td>
<td>90.4</td>
</tr>
<tr>
<td>Head turned to 1 side at any point</td>
<td>149</td>
<td>60</td>
<td>26/149 (17.4)</td>
<td>0.69 (0.54 to 0.85)</td>
<td>91.3</td>
</tr>
<tr>
<td>Eyes turned to 1 side at any point</td>
<td>138</td>
<td>70</td>
<td>34/138 (24.6)</td>
<td>0.46 (0.28 to 0.63)</td>
<td>80.5</td>
</tr>
<tr>
<td>Postictal phase ≥60 min</td>
<td>180</td>
<td>42</td>
<td>33/180 (20.6)&lt;sup&gt;d&lt;/sup&gt;</td>
<td>0.59 (0.43 to 0.75)</td>
<td>88.1</td>
</tr>
</tbody>
</table>

<sup>a</sup>Excludes patients for whom data point from at least 1 assessor was missing or marked as “unsure,” “don’t know,” or “unable to assess.”

<sup>b</sup>Defined as having a history of a brain tumor, other neoplasm, stroke, coagulopathy, sickle cell disease, anatomical cardiac defect, or presence of an intracranial ventricular shunt.

<sup>c</sup>A total of 82 patients younger than 24 months were not included in the analysis.

<sup>d</sup>Truncated from the following: 23 (13.5%) had seizure duration of < 15 seconds, 38 (21.2%) were 15 seconds to < 1 minute, 75 (44.1%) were 1 to <5 minutes, 21 (12.4%) were 5 minutes to <15 minutes, and 15 (8.8%) were ≥15 minutes.

<sup>e</sup>Defined as motor aspect 1-sided or head or eyes turned to 1 side at any point.

<sup>f</sup>Truncated from the following: 38 (23.8%) with no postictal phase, 4 (2.5%) with postictal phase of < 1 minute, 20 (12.5%) were 1 to <5 minutes, 50 (31.2%) were 5 minutes to <30 minutes, 15 (9.4%) were 30 to <60 minutes, and 33 (20.6%) were ≥60 minutes.
status in the ED, and any focal neurological finding on physical examination. All of these factors have been associated with an increased likelihood of finding a clinically important intracranial abnormality on CT or MRI.1,4,5 The generally modest interrater agreement in our study should not be surprising, as reliability has been only moderate among neurologists when independently assessing whether an event was actually a seizure, as well as the classification of the seizure.9

Although no previous studies have evaluated interobserver agreement of clinical findings in children with unprovoked seizures when evaluated by acute care physicians (eg, ED practitioners), our results are similar to those found in the assessments of children in other clinical circumstances, and when assessments were made by neurologists. One study noted at least moderate agreement among pediatric neurologists for seizure focality (κ = 0.58) and seizure duration ≥10 minutes (κ = 0.75) in children with febrile seizures.10 Compared with our prospective data collection, neurologists in that study assessed findings from seizure descriptions assembled from semistructured interviews by telephone and medical records.10 In a previous evaluation of children with febrile status epilepticus, neurologists similarly found greater agreement on seizure duration compared with focality. This likely reflects the different ways that clinicians question parents and interpret their responses regarding seizure focality.11 Among the other variables we assessed, a previous prospective ED study of children with blunt head injuries found similar agreement for the presence or absence of altered mental status (κ = 0.48) and focal neurological deficit (κ = 0.69).12

We noted that clinicians frequently were unable to determine if a particular finding was present or absent. Much of the inability to assess particular findings can be attributed to the age distribution of the study population; approximately one-third of the study sample being younger than 2 years, making it difficult to assess aspects of patient history such as headache and the neurological examination. Because seizure focality may dictate ED clinician choice to obtain emergent neuroimaging, it is important to note that assessors were frequently unable to determine if the motor aspect was focal, including whether the eyes or head turned and stayed to 1 side at any time point. Often, this seems to be due to a lack of obtaining the history from an adult witness of the seizure, highlighting the need to obtain the details from a reliable historian.

When able to assess a clinical finding, raw agreement was consistently high. High raw agreement did not necessarily result in substantial κ values be-

### TABLE 2 Interrater Reliability for Physical Examination Findings

<table>
<thead>
<tr>
<th>Criterion</th>
<th>No. of Evaluable Patients</th>
<th>No. of Patients for Whom at Least 1 Assessor Marked “Unsure,” “Don’t Know,” or “Unable to Assess”</th>
<th>Characteristic Present per First Assessor, n/N (%)</th>
<th>κ (95% CI)</th>
<th>Percent Overall Agreement</th>
</tr>
</thead>
<tbody>
<tr>
<td>General physical examination</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Concerning skin findings</td>
<td>217</td>
<td>0</td>
<td>3/217 (1.4)</td>
<td>0.17 (± 0.14 to 0.48)</td>
<td>95.9</td>
</tr>
<tr>
<td>Generally ill or not well appearing</td>
<td>201</td>
<td>4</td>
<td>21/201 (10.4)</td>
<td>0.39 (0.20 to 0.58)</td>
<td>87.1</td>
</tr>
<tr>
<td>Neurologic examination*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Abnormal mental status</td>
<td>195</td>
<td>9</td>
<td>25/195 (12.8)c</td>
<td>0.48 (0.29 to 0.66)</td>
<td>88.8</td>
</tr>
<tr>
<td>Abnormal overall neurologic examination other than mental status</td>
<td>195</td>
<td>9</td>
<td>5/195 (2.6)</td>
<td>0.40 (0.14 to 0.66)</td>
<td>93.4</td>
</tr>
<tr>
<td>Any focal neurologic findings (includes pupil size, cranial nerves motor tone, motor strength, and reflexes)</td>
<td>202</td>
<td>9</td>
<td>6/202 (3.0)</td>
<td>0.66 (0.3 to 1.0)</td>
<td>98.5</td>
</tr>
<tr>
<td>Abnormal muscle tone</td>
<td>202</td>
<td>2</td>
<td>3/202 (1.5)</td>
<td>0.59 (0.23 to 0.95)</td>
<td>98.2</td>
</tr>
<tr>
<td>Abnormal motor strength</td>
<td>193</td>
<td>12</td>
<td>4/193 (2.1)</td>
<td>0.56 (0.12 to 1.0)</td>
<td>98.4</td>
</tr>
<tr>
<td>Abnormal sensation</td>
<td>117</td>
<td>86d</td>
<td>1/117 (0.9)</td>
<td>1.0 (1.0 to 1.0)</td>
<td>100</td>
</tr>
<tr>
<td>Abnormal reflexes</td>
<td>164</td>
<td>39</td>
<td>7/164 (4.3)</td>
<td>0.48 (0.13 to 0.84)</td>
<td>96.3</td>
</tr>
<tr>
<td>Abnormal gait</td>
<td>107</td>
<td>97d</td>
<td>2/107 (1.9)</td>
<td>0.39 (0.16 to 0.59)</td>
<td>97.2</td>
</tr>
<tr>
<td>Abnormal cranial nerves</td>
<td>168</td>
<td>31</td>
<td>1/168 (0.6)</td>
<td>Unable to calculate</td>
<td>99.4</td>
</tr>
<tr>
<td>Abnormal cerebellar function*</td>
<td>90</td>
<td>34</td>
<td>0/90</td>
<td>Unable to calculate</td>
<td>97.8</td>
</tr>
<tr>
<td>Unequal pupil size</td>
<td>199</td>
<td>1</td>
<td>1/199 (0.5)</td>
<td>Unable to calculate</td>
<td>99.5</td>
</tr>
<tr>
<td>Abnormal posturing</td>
<td>185</td>
<td>3</td>
<td>2/185 (1.1)</td>
<td>−0.007 (−0.017 to 0.003)</td>
<td>98.4</td>
</tr>
<tr>
<td>Abnormal speech*</td>
<td>108</td>
<td>19</td>
<td>1/108 (0.9)</td>
<td>−0.009 (−0.02 to 0.004)</td>
<td>98.1</td>
</tr>
</tbody>
</table>

*Excludes patients for whom data point from at least 1 assessor was missing or marked as “unsure,” “don’t know,” or “unable to assess.”

†Includes 64 patients (for sensation) and 66 (for gait) who were younger than 24 months.

‡Truncated from the following: 170 (87.2%) normal mental status, 19 (9.7%) mildly impaired, and 6 (3.1%) moderately/severely impaired.

aIncludes patients who were sedated, paralyzed, or intubated at the time of examination.

bExcludes 6 patients who were sedated, paralyzed, or intubated at the time of examination.

cExcludes patients for whom data point from at least 1 assessor was missing or marked as “unsure,” “don’t know,” or “unable to assess.”

A priori excludes from all analyses patients either younger than 24 months or those sedated, paralyzed, or intubated at the time of examination (n = 85).
cause of the rarity of the presence of certain abnormal findings (eg, abnormal cranial nerve examination). The relative rarity of specific findings is a limitation of the study, resulting either in low κ values despite high raw agreement, wide 95% CIs, or an inability to calculate κ values. For certain variables, a single disagreement on the presence of a finding could dramatically change the point estimate for the κ value because of the rarity of the finding. Both the frequent inability of clinicians to assess specific findings and the rarity of particular findings may limit the general utility of a given factor to guide the decision to obtain emergent neuroimaging. For example, cerebellar functioning frequently could not be assessed and when assessed, was rarely abnormal. This variable would only be useful to determine the need for ED neuroimaging if it uniquely identified patients at high risk for a clinically important intracranial abnormality.

In addition, our study was performed in academic pediatric EDs, potentially limiting the generalizability of our findings. However, a substantial proportion of assessors were residents, which likely increases the degree to which our findings can be generalized to clinicians at different levels of training. Finally, although the 2 assessors were asked to conduct their examinations within 30 minutes of one another, there is the potential that the physical examination findings changed between the times of the 2 examinations.

CONCLUSIONS

In children with first unprovoked seizures evaluated in the ED, clinicians frequently assess findings from seizure-specific history with substantial agreement beyond chance. Those clinical variables that have been associated with the presence of intracranial abnormalities and show reliability between assessors, such as seizure focality and the presence of any focal neurological finding, may be more useful than other predictors from the history and physical examination in the ED assessment of children with first unprovoked seizures.

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Interobserver Agreement in the Assessment of Clinical Findings in Children With First Unprovoked Seizures


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