Do children who have had a first febrile seizure require a lumbar puncture?

Kimia et al. Utility of lumbar puncture for first simple febrile seizure among children 6 to 18 months of age. Pediatrics 2009; 123:6-12.

Take Home Message: The risk of bacterial meningitis in an otherwise healthy, well-appearing child 6 to 18 months of age with a first simple febrile seizure is very low.

Highlights: In 1996, the American Academy of Pediatrics (AAP) had issued guidelines recommending that a lumbar puncture (LP) be strongly considered for patients <12 months of age and considered for patients 12-18 months of age presenting with a first simple febrile seizure. [i] These recommendations were based on the fact that bacterial meningitis commonly presents with a seizure. This retrospective study, published in 2009[ii], was the first study to attempt to determine the rate of bacterial meningitis in children specifically in the age range for which the AAP gave recommendations presenting with a first simple febrile seizure. Kimia et al. looked retrospectively at clinically well-appearing patients 6-18 months of age who presented to Boston Children's Hospital's Emergency Room with a first simple febrile seizure. Out of the 704 patients over 11 years who met their criteria, lumbar puncture was attempted in 38% overall (in 70% of the infants <12 months). No pathogen grew in any of the CSF cultures, and no patients were ultimately diagnosed with bacterial meningitis. Of note, the majority of children in this study were fully vaccinated. Thus, they demonstrated that it is rare for a simple febrile seizure to be the only manifestation of bacterial meningitis.

Using this study among others in their evidence, the AAP updated their recommendations in 2011[iii] and no longer recommend lumbar puncture in well-appearing, fully immunized children presenting with a simple first

febrile seizure. This also takes into account that there has been widespread immunization against *Haemophilus influenza type B* (HIB) and *S pneumoniae* since their previous guidelines. The new recommendations state that: lumbar puncture should be performed if a child with a first simple febrile seizure is ill appearing or has signs and symptoms of meningitis, considered in a child less than 12 months who is deficient in their Haemophilus influenza type B and S.pneumoniae immunizations or if the immunization status is unknown; and considered if the child has been pretreated with antibiotics.

The Nitty-Gritty:

- **Design:**
    - Retrospective cohort study
    - N= 704
    - Setting: Boston Children's Hospital Emergency Room 1995-2006
    - Primary objective: to determine the rate of bacterial meningitis among otherwise healthy infants 6 to 18 months of age who presented with first simple febrile seizure
- **Population:**
    - **Inclusion Criteria:**
        - clinically well-appearing
        - 6 to 18 months of age

- § first simple febrile seizure (first episode of seizure accompanied by fever, manifested as a primary generalized seizure lasting ≤ 15 minutes and not recurring within 24 hours)
- § no evidence of central nervous system infection
- § no underlying seizure disorder

- o **Exclusion Criteria**
  - § previous seizures
  - § underlying illness (e.g., syndromes associated with seizures, ventriculoperitoneal shunt or chronic medication use)
  - § trauma
  - § clinical suspicion of meningitis

- o **Baseline Characteristics**
  - § Age: 6-12 months: 27%, 12-18 months: 74% (median age 14 months)
  - § female: 45.7%
  - § 98% up to date on immunizations (among those with data on immunization which was available only for 80%)

§ 10% given ≥1 dose of antibiotic before ED vision (65% for current illness, 7% on prophylactic antibiotic therapy, 28% given single dose on day of seizure prior to this ED evaluation)

- **Results:**

§ Lumbar puncture attempted in 38% of cases with CSF successfully obtained in 37% (performed in 70% of infants <12 months and 25% of infants 12 to 18 months of age)

§ CSF pleocytosis (defined as CSF WBC > 7/mm3): 3.8%

§ Median CSF WBC count: 1 cell/mm3

§ Pathogen identified in CSF cultures: 0%

§ Cultures yielding a contaminant: 3.8%

§ Return to hospital with a diagnosis of bacterial meningitis: 0%

[i] American Academy of Pediatrics, Provisional Committee on Quality Improvement and Subcommittee on Febrile Seizures. Practice parameter: the neurodiagnostic evaluation of a child with a first simple febrile seizure. Pediatrics 1996; 97: 769-772.

[ii] Kimia et al. Utility of lumbar puncture for first simple febrile seizure among children 6 to 18 months of age. Pediatrics 2009; 123:6-12.

[iii] American Academy of Pediatrics: Subcommittee on Febrile Seizures. Clinical practice guideline – febrile seizures: guideline for the neurodiagnostic evaluation of the child with a simple febrile seizure. Pediatrics 2011; 127: 389-394.