

FEBRILE SEIZURE GUIDELINES FOR COMMUNITY PHYSICIANS

DEFINITION

A febrile seizure is an epileptic seizure associated with a febrile illness not caused by an infection of the central nervous system (CNS), without previous neonatal seizures or a previous unprovoked seizure, and not meeting criteria for other acute symptomatic seizures (International League Against Epilepsy).

Febrile seizure is associated with fever > 100.4 F or 38C by any method of measurement, which occurs between 6 and 60 months of age.

EPIDEMIOLOGY

- 2-5% (approximately 4%) of all children will have febrile seizures
- 2% of the children with first febrile seizure will have epilepsy by age 7 year
- Timing of fever with respect to seizure onset can be variable:
 - most febrile seizures occur during first day or two of a fever, 57% in 1–24 hours after fever onset
 - children can also have a seizure either prior to or more than 24 hours after the onset of fever
- Children with febrile seizures typically have rectal temperatures greater than 101 F.

CLASIFICATION

Simple febrile seizure (SFS):

- Primary generalized convulsions of the body, lasting less than 15 minutes, resolve spontaneously, do not recur within 24 hours
- Familial, probably autosomal dominant with incomplete penetrance
- 33% of children with SFS will have a second SFS and 50% of these will have a third SFS
- If a child is less than 12 months of age and has a SFS, risk of recurrence is 50%
- More than 3 SFS are unusual and suggests that the child may develop nonfebrile seizures
- The first febrile seizure should occur prior to 3 years of age. If a child who is 3 years of age or older and has their first generalized tonic clonic seizure associated with fever, it is less likely to be a SFS. These children probably have an underlying epilepsy, provoked by fever. Please consider MRI scan of the brain and EEG.
- If a child is still seizing by the time they reach the ER, presume that the seizure is prolonged and represents a complex febrile seizure (CFS—see below).

Complex febrile seizure (CFS):

- Focal,
- Prolonged
- More than 15 minutes, some may not resolve spontaneously
- Recurrent within 24 hours

POTENTIAL CAUSES/ DIFFERENTIAL DIAGNOSIS

- Simple febrile seizure, age limited genetic epilepsy
- Infection of the nervous system: meningitis, encephalitis, epidural and subdural infections
- Underlying epilepsy in which fever triggered the seizure
- Epidural hematoma

DIAGNOSTIC EVALUATION

Most important goal is to identify the cause of the child's fever.

1. Lumbar puncture

- should be performed in any child presenting with a seizure and fever and has meningeal signs/symptoms
- is an option when:
 - the child is deficient in Hib or streptococcus pneumoniae immunization
 - the child is pretreated with antibiotics (they can mask the signs/symptoms of meningitis)
- is not necessary after a brief generalized seizure if the child recovers completely and rapidly

Only 1/4 of children with meningitis will have seizures, but usually after, they do not wake up; coma, obtundation is expected

AAP evaluation guidelines recommend that a lumbar puncture be:

- strongly considered in infants less than 12 months of age
- considered between 12 and 18 months of age because clinical signs of meningitis may be subtle
- recommended in children older than 18 months, in the presence of history or physical examination findings suggesting intracranial infection
- recommended after a first complex febrile seizure, in a child with persistent lethargy, or who has received prior antibiotic treatment

2. Laboratory studies are not needed routinely for the sole purpose of identifying the cause of simple febrile seizure: CBC, electrolytes, glucose, calcium, magnesium, phosphorus.

3. Electrodiagnostic studies

- EEG is not needed in the evaluation of a neurologically healthy child with a simple febrile seizure
- EEG is needed on children neurologically abnormal or who have family history of epilepsy

4. Neuroimaging

- is not needed in the routine evaluation of the child with simple febrile seizure
- MRI is required in infants with prolonged and /or focal febrile seizures or abnormal neurological examination

No guidelines exist for workup of complex febrile seizures.

Children with a first complex febrile seizure who otherwise appear well and who have normal neurological examinations are at low risk of structural abnormalities that require emergency interventions.

MANAGEMENT/ TREATMENT RECOMMENDATIONS

- Medications are unnecessary in children with one brief simple febrile seizure.
- Clear explanation, reassurance and education of caregivers are keys in the management of the child.
- Medical reevaluation of patients and parental education in a follow-up appointment
- Prophylactic use of antipyretics and sedatives/antiepileptic drugs for possible recurrence of febrile seizure has not been shown to be effective.
- AAP does not recommend the use of continuous or intermittent antiepileptic therapy, given that the potential toxicities associated with these medications outweigh the relatively minor risks posed by SFS, because:
 - No evidence that prevention of febrile seizures reduces the risk of developing subsequent epilepsy.

- No evidence that links simple febrile seizures to development of cognitive disabilities or premature death.
- Diazepam, orally or rectally every 8 hours during febrile illnesses, may be effective in preventing recurrence of febrile seizures. However, benzodiazepines can cause lethargy, drowsiness, and ataxia, and sedation could mask an evolving central nervous system infection. The AAP guideline released in 2008 does not recommend prophylactic use of diazepam as the risk outweighs the benefits.

Complex Febrile Seizures: Intravenous diazepam or lorazepam or rectal diazepam can be used as the first line medication. Persistence of seizure activity warrants initiation of full status epilepticus protocol.

Conditions requiring admission of the patient include the following:

- More than 1 seizure within 24 hours
- Unstable clinical status
- Lethargy beyond the postictal period
- Uncertain home situation
- Unclear follow-up care

PROGNOSTIC

- No long term adverse effects of simple febrile seizures have been identified.
- There is no evidence to show that second or third SFS causes epilepsy or brain damage.

There are 4 potentially adverse outcomes:

1. There is no evidence of decline in IQ or learning problems in children with SFS, except in children who had prior neurologic abnormalities.
2. Increased risk for epilepsy:
 - Children with SFS - the same risk of epilepsy by age 7 years as the general population **
Dr. Totoiu will follow-up
 - Exceptions: children who had multiple febrile seizures, younger than 12 months at the time of first seizure, family history of epilepsy are at higher risk for developing generalized afebrile seizures by age 25 years in 2.4%.
 - No evidence of simple febrile seizures causing structural damage to the brain
3. Children with simple febrile seizures have a higher rate of recurrence if:
 - younger than 12 months at the time of first febrile seizure, have a 50% probability of recurrence.
 - older than 12 months have 30 % probability of recurrence.
 - those who had 2 febrile seizures have a 50% chance of having at least one additional recurrence.
4. Theoretical risk of a child dying during a simple febrile seizure has never been reported.

REFERENCES:

1. Clinical Practice Guideline—Febrile Seizures: Guideline for the Neurodiagnostic Evaluation of the Child with a Simple Febrile Seizure – Pediatrics, Volume 127, Number 2, February 2011

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3. G. Fenichel – *Clinical Pediatric Neurology*, Sixth Edition, 2009
4. Shinnar S, Glauser TA. Febrile Seizures. *J Child Neurol* 2002;17:S44-S52