



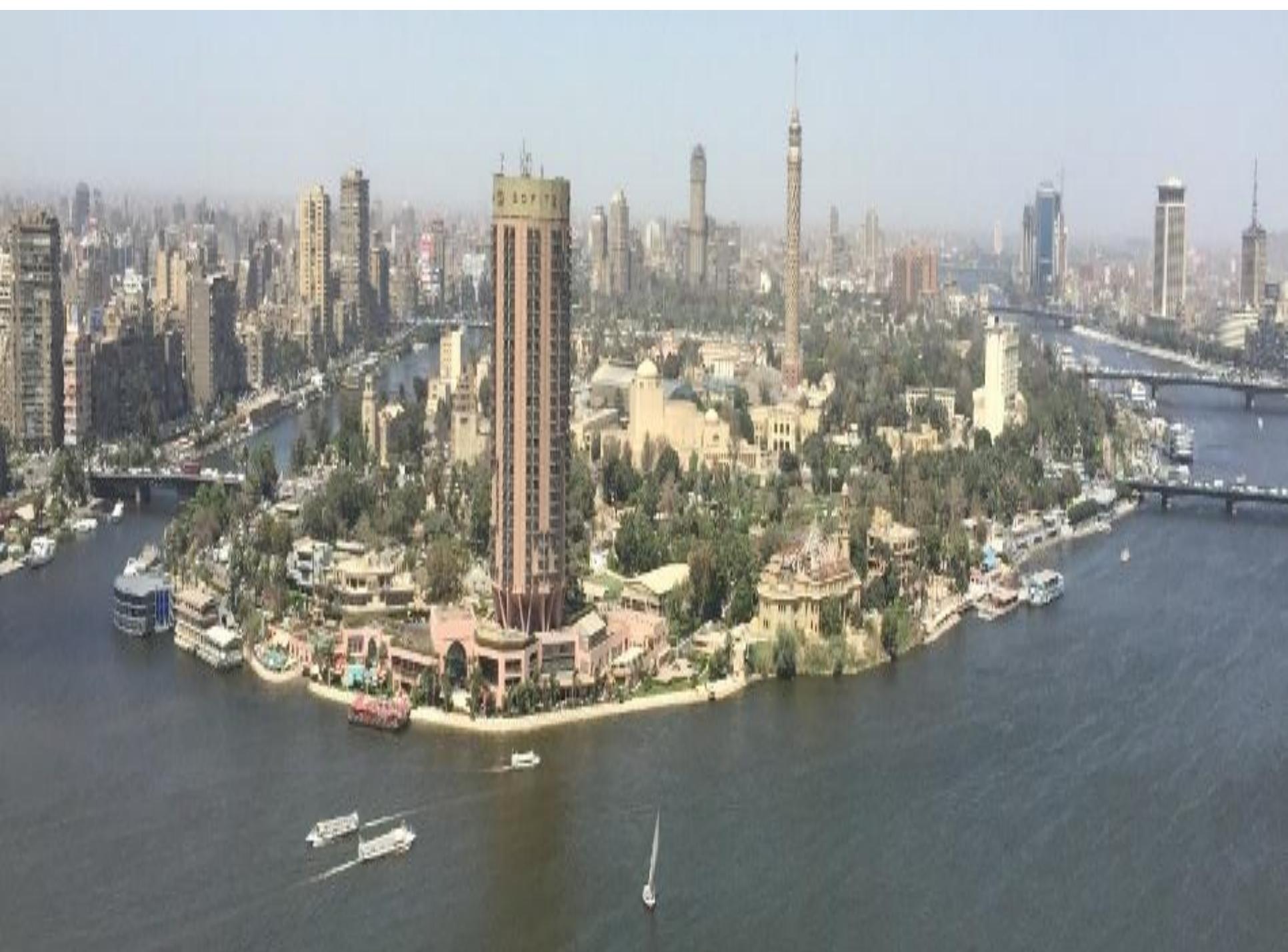
Approach To Febrile Seizure in Pediatrics in ED

By

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Learning Outcomes

- Definition
- Epidemiology
- History
- Physical Examination
- Types of Febrile Seizures
- Evaluation and Management
- Investigations needed
- Morbidity and Mortality
- Disposition
- Parental Education

Definition of Febrile Seizure in Children

Definition: *Seizure occurring in the appropriate age group (6 months – 5 years) in conjunction:*

with a fever ($T > 38^{\circ}\text{C}$), or history of recent fever

without: - a history of previous afebrile seizures or
- presence of any other underlying cause
(neurologic disease or CNS infection)

- Seizures are the **clinical manifestation of aberrant, abnormal electrical activity** in **the cortical neurons**.
- Thus they can be regarded as a **symptom** of **cerebral pathology** and are not in themselves a disease.
- The term **epilepsy is not synonymous with seizures**.

Epidemiology

Most common age group: 6mo - 3yrs (range 6mo - 60 mo)

- ❑ Seizures occur in 3% - 5% of all children
- ❑ Febrile seizures occur in 2%- 4% of all children
- ❑ Epilepsy occurs in approximately 1%

- ❑ Febrile seizures represent the most common cause of pediatric seizures seen in the out-of-hospital and ED.

- ❑ Children have only a slightly increased risk of having afebrile seizure disorder.

- ❑ HHV-6 (human herpesvirus 6), the causative agent of Roseola is the most commonly identified viral association.

History

- Seizure may occur **prior to the parent knowing** the child actually had a fever.
- **Detailed description of seizure** (generalized tonic-clonic versus focal), pre/post-ictal activity.
- **No other concerning complaints** (no headache, vomiting, lethargy, focal neurologic complaints).
- Child essentially **“normal” before** the seizure, and again **after** awakening from post-ictal period.
- **May** or **may not** have **viral/ URI** symptoms.
- **May** have **history of febrile seizures** in the past (**1/3** of febrile seizures recur).
- **Family history of febrile seizures** (**strong association**), afebrile seizures.

Physical Examination

- **General appearance** (vitals inclu. temp. & pulse oximetry).
- Plot on a **growth chart** (height, weight, head circum.)
- **Developmental stage** (motor, language & social domains).
- Signs of **trauma** & signs of **↑ ICP** (Fundoscopy for papilledema)
- **Rapid cardiopulmonary** assessment (evaluate perfusion).
- Evaluate for **signs of meningitis** – **nuchal rigidity, bulging fontanel, Kernig's test** and **Brudzinski's test**.
- Assess for **lethargy**, degree of **irritability, high-pitched cry**.
- **Detailed neurological** examination for **focal** deficits or abnormalities.
- **Skin lesions** suggesting **neurocutaneous dis.** (seizure activity).
- Evaluate for **source of infection/ fever**.

Types of Febrile Seizure

Simple Febrile Seizures:

- **Generalized** (nonfocal)
- Lasting **less than 15 min**
- Occurs **once in 24 hr** period

Complex Febrile Seizures:

- **Focal**
- Lasting **more than 15 min**
- Occurring **more than once in 24 hr** period

Symptomatic Febrile Seizures:

- Age and fever are the same as for simple FS
- Has **preexisting neurologic abnormality** or **acute illness**

The child's prior neurologic state is not considered as a criterion for classification





Evaluation & Management of Febrile Seizures in Children

Guidelines

Evaluation & Management

- Most febrile seizures are **brief** and **self-limiting**.
- **Do not require** any specific treatment or extensive workup, and have a **benign** prognosis.
- Begin with attention to the **ABC's**.
- **Appropriate posturing** (lateral recumbent, with head extension), and keeping **airways open**.
- Check finger stick **blood glucose**.

Evaluation & Management

- Seizures lasting **more than 5 minutes** should be treated with **benzodiazepines**:
 - **Lorazepam 0.1mg IV**
 - **Rectal diazepam if no IV access is available**
 - 1-5 yr : 0.5 mg/ kg
 - 6-11 yr: 0.3 mg/ kg
 - 12+ yr : 0.2 mg/ kg
- For seizures **refractory to benzodiazepines**, a **full status epilepticus treatment** protocol should be initiated.
- **For further workup**, determine if the child's seizure meets criteria for '**Simple**' (70-75%) or '**Complex**' (20-25%) or '**symptomatic**' (5%).

Simple Febrile Seizure (70-75%)

Criteria:

- **Generalized** (nonfocal) clonic or tonic-clonic
- Lasting **less than 15 min**
- Occurs **once in 24 hr** period

*The child is otherwise **neurologically healthy**.*

*Fever (and seizure) is **not caused by** meningitis, encephalitis, or any other illness affecting the brain.*

Work-up:

- **No specific** laboratory studies.
- Focus on **diagnosing the cause of fever**. Other laboratory tests may be indicated by the nature of the underlying febrile illness.
- Skull X-ray, brain CT & MRI **are not indicated** in the simple FS.

Complex Febrile Seizure (20-25%)

Criteria (any of the following):

- Focal
- Lasting more than 15 min
- Occurring more than once in 24hr period (maybe in close succession)

Neurologic status & fever are the same as for simple febrile seizure

Work-up: Strongly consider a more extensive workup that may include any or all of the following:

- CBC, Blood culture
- U/A and culture (clean catch urine or catheterized urine)
- Basic Metabolic Panel (BMP) - (electrolytes)
- CT scan
- LP
- Urine toxicology

Symptomatic Febrile Seizure (5%)

Criteria:

- Age and fever are the same as for simple FS.
- The child has a preexisting neurologic abnormality or acute illness

Work-up:

- Consider the workup that is dictated by the preexisting neurologic abnormality or acute illness

Distinction Regarding Age

- Most patients should fall into the age range **6 mo - 3 yrs**. Although there may be children both **younger** and **older** who will ultimately be determined to have febrile seizures. The **farther one is from that basic age range** the more important it is to **consider other causes**.
- In addition it is generally appreciated that it may be more **difficult in younger children to appreciate meningeal signs** - **particularly** those **under 12 mo of age**.

The 2003 ACEP Committee on PEM



Recommends that an “LP should be strongly considered” in a child younger than 18 mo if any of the following are present:

- History of irritability, decreased feeding or lethargy.
- An abnormal appearance or mental status persisting after the postictal period.
- Any physical signs of meningismus (bulging fontanelle, Kernig or Brudzinski signs, photophobia, or severe headache).
- Any complex features (Seizure > 15 min, more than 1 in 24hrs, or any focality).
- Any slow postictal clearing of mentation.
- Pretreatment with antibiotics.

Lumbar Puncture (LP)

The 2011 AAP Clinical Practice Guidelines

Strongly recommends: “LP should be performed” in any child who:

- Presents with a **seizure and a fever**, and
- Has **meningeal signs and symptoms**, or whose
- History/exam is suggestive of **meningitis** or **intracranial infection**.

A LP is “an option” for the following children:

- Any infant **6 -12 mo** who presents with a **seizure and fever** when the infant is considered **deficient in Haemophilus influenzae type b (Hib) or Streptococcus pneumoniae immunizations** (i.e. has not received scheduled immunizations as recommended), or if immunization status cannot be determined.
- Any child who presents with a **seizure and fever** and is **pretreated with systemic antibiotics, days before the seizure**

Lumbar Puncture (LP)

Recommendations of AAP Updated 2017

According to the recommendations of American Academy of Pediatrics (AAP)

- In children younger than 12 months: **strongly consider LP**, because the signs and symptoms of bacterial meningitis may be **minimal or absent** in this age group.
- In children aged 12-18 months: **LP should be considered**, because clinical signs and symptoms of bacterial meningitis may be **subtle** in this age group
- In children older than 18 months: the **decision** to perform LP **rests on the clinical suspicion of meningitis**.
- We should perform LP in a population in which there is **only a 3–5% chance of pleocytosis (meningitis)**.

Neuroimaging with CT scan

- Neuroimaging with CT scan is generally **not recommended unless there is** clinical evidence of:
 - **Increased ICP** (papilledema, obtundation, or “sunsetting”)
 - or **a suspicion of cerebral abscess** (immunocompromised, focal neurologic findings, evidence of endocarditis).

These are somewhat **related** to the above **indications for doing LP**.

- Most would **agree** with a plan that includes a **CT prior to performing the LP** whenever any of these **atypical** or “**complex**” features are present.
- An **EEG should not** be performed in the evaluation of a **neurologically healthy** child with a “**simple**” febrile seizure.

Treatment

- Neither long-term nor intermittent anticonvulsant therapy is indicated for children who have 1 or more simple FS.
- There is not enough evidence that antipyretics such as Tylenol or Ibuprofen would reduce the risk of seizures in a febrile illness.
- There are strong evidences that intermittent use of oral (0.33 mg/kg/ 8 h) or rectal diazepam is effective in preventing the subsequent febrile seizures, but potential side effects (sedation and ataxia) should be considered.
- Treatment is otherwise largely supportive.

Clobazam could be as effective as diazepam, but ataxia is less prominent.

Phenobarbital is not recommended as a means for prevention of FS.

Sodium valproate is also effective, however, its use is not indicated.

Mortality and Morbidity

- **No mortality** has been reported with FS. Even in a very prolonged FS (**febrile status**), there is **little chance for death**.
- There is also **no report indicating morbidity** such as motor deficit and/or cognitive impairment.
- Even prolonged febrile seizures are **not associated with cognitive deficits**, so the **prognosis for normal neurologic function is excellent**.
- The literature **does not support** the hypothesis that simple FSs **lower intelligence** (ie, cause a learning disability) or are associated with **increased mortality**.

Risk of Recurrence and Epilepsy

- Children with a **previous simple FS** are **at increased risk of recurrent febrile seizures**; in approximately **1/3 of cases**.
- Children **younger than 12 months** at the time of their first simple FS have a **50% probability of having a second seizure**. **After 12 months**, the probability **decreases to 30%**.
- Children who have **simple FS** are at **an increased risk for epilepsy**. The rate of epilepsy by age 25 years is approximately **2.4%**, which is about **twice** the risk in the general population.
- **Essential update: Starting MMR/MMRV vaccination earlier may reduce seizure risk.**

Measles-Mumps-Rubella (MMR) or Measles-Mumps-Rubella-Varicella (MMRV)

Disposition

- **Admission** should be considered for:
 - Infants < 6 mo
 - Children with complex features
 - Social concerns
- **Discharge instructions** in the form of **detailed anticipatory guidance** includes: information of recurrence of seizures, worrisome signs to watch for, what to do if another seizure occurs & when to call 911 and/or return for further evaluation.
- **Written discharge** instruction sheets should be available in addition to verbal instructions.
- Although the use of **antipyretics** have **not** been shown to prevent febrile seizures, it is **still reasonable to recommend the continuation of antipyretics** for the fever because of parental feelings of anxiety and guilt.

Parental Education

The best treatment policy is “**Parental Education**” about:

- The **benign nature** of febrile seizure and the **risks and benefits** of any medication.
- **How to deal with the convulsing child** as well as some simple and clear explanations about febrile seizures and their benign nature and outcome.
- **How to use rectal diazepam** in an emergency condition at home. Maybe this is the **most reliable and convenient type of treatment**.

Any Questions



THANK YOU

