

# Management of Pediatric Febrile Seizures

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## ABSTRACT

Febrile seizures are the most common seizure disorder. Febrile seizures are frightening to witness, and therefore caregiver education is paramount to help relieve anxiety levels. Acknowledgment of this concern by pediatric health care providers is needed to understand the importance of education, reassurance, and anticipatory guidance for caregivers. This article aims to discuss the assessment, diagnosis, and management of febrile seizures for the nurse practitioner based on the most current literature. Through appropriate clinical interventions, anticipatory guidance, and caregiver education, the nurse practitioner can substantially increase the comfort of the patients and their caregivers.

**Keywords:** anticipatory guidance, febrile seizure, fever, pediatric/child, primary care

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Febrile seizures are the most common seizure disorder in childhood, and children with this condition may present to the primary care provider's office or the emergency department. Febrile seizures have a peak incidence in the second year of life,<sup>1</sup> occurring in 2% to 5% of the pediatric population.<sup>2</sup> According to the most recent guidelines from the American Academy of Pediatrics (AAP),<sup>3</sup> a febrile seizure is a seizure accompanied by fever (temperature  $\geq 100.4^{\circ}\text{F}$  or  $38^{\circ}\text{C}$  by any method) and without central nervous system infection that occurs in infants and children aged 6 through 60 months.

Most febrile seizures are benign but are nonetheless frightening for caregivers to witness; therefore caregiver education is important to help relieve anxiety levels. Febrile seizures are emotionally traumatic for caregivers. Many caregivers may think that their child is dying during the seizure event and have a persistent fear of recurrence.<sup>4</sup> Acknowledgment of this concern by nurse practitioners (NPs) is needed to understand the importance of education, reassurance, and anticipatory guidance for pediatric caregivers. This article will discuss the assessment, diagnosis, and management of febrile seizures, review current literature, and address strategies to implement key education points into current practice.

## PATHOPHYSIOLOGY

The mechanism through which a fever can cause a febrile seizure is still unclear. However, the cause of febrile seizures is known to be multifactorial, with genetic and environmental factors.<sup>5</sup> An increase in brain temperature alters neuronal functions and ion channels, which influences neuronal firing and excitability, resulting in seizures.<sup>6</sup> Genetics comes into play with neurodevelopmental vulnerability, alterations in sodium channel expression, hypothalamic dysregulation, and cortical and hippocampal excitability.<sup>7</sup> Environmental triggers are believed to be involved through metabolic dysregulatory pathways.<sup>7</sup> The secretion of cytokine, an inflammatory mediator, is also known to be part of the mechanism of febrile seizures.<sup>6</sup>

## RISK FACTORS

A febrile seizure is generally a benign condition, related to various causative and risk factors (Table 1). Febrile seizures are an age-dependent phenomenon, occurring between 6 months and 5 years of age, attributed to the vulnerability of the child's developing nervous system. Family history of febrile seizures, specifically in a first-degree relative, also plays a role. The degree of the fever ( $\geq 103^{\circ}\text{F}$  or  $39^{\circ}\text{C}$ ), rather than the rate of the temperature rise, is

**Table 1. Causative and Risk Factors of Febrile Seizures**

Factors Associated With Febrile Seizures	
Individual	Age Degree of fever History of febrile seizure
Familial	First-degree relative with history of febrile seizures
Environmental	Positive illness contact at home, day care, or school
Virus	Respiratory: influenza virus, parainfluenza, respiratory syncytial virus, adenovirus Enteric: enterovirus, Coxsackie virus, rotavirus Herpesviruses: human herpesvirus, cytomegalovirus, herpes simplex virus
Bacteria	Respiratory: <i>Streptococcus pneumoniae</i> Enteric: <i>Shigella dysenteriae</i> , <i>Salmonella enteritidis</i> Urinary: <i>Escherichia coli</i>
Vaccination	Measles, mumps, and rubella (MMR) Pertussis
Others	Channelopathies, pH, water and electrolyte imbalance, cytokines

Adapted from Mohebbi, Holden, and Butler IJ.<sup>19</sup> Copyright 2008 by Sage Publications.

another risk factor in children.<sup>6</sup> Although viral and bacterial infections are identified risk factors in febrile seizures, there is a higher association with viral infections because they tend to cause high fevers. Finding the causative factor of the febrile seizure event may help aid in diagnosis, management, and prevention of recurrent episodes, as well as provide comfort to the child's parents and caregivers.

### CLINICAL PRESENTATION

Signs and symptoms of febrile seizures include loss of consciousness, generalized or focal twitching or jerking of arms and legs, eye deviation or rolling back, pallor or cyanosis, and difficulty breathing. After the seizure, the child appears drowsy, lethargic, disoriented, and confused. This postictal state may last up to 30 minutes, after which the child should return to baseline.<sup>8</sup>

Febrile seizures are classified as simple, complex, or status epilepticus depending on characteristics, duration, and recurrence. Simple febrile seizure is

defined as primary generalized seizures that last for less than 15 minutes and do not recur within 24 hours.<sup>2</sup> This is the most common type of febrile seizure, occurring in 70%–75% of children with febrile seizures.<sup>9</sup> Complex febrile seizure is defined as focal, prolonged (duration longer than 15 minutes but less than 30 minutes), and/or recurrent within 24 hours. Approximately 20%–25% of febrile seizures are complex.<sup>9</sup> Febrile status epilepticus is defined as generalized or focal seizures lasting more than 30 minutes.<sup>2</sup> The seizure can be continuous or intermittent, without return to neurologic baseline during the period.

### EVALUATION

#### History

A thorough history should be taken on all children after an episode of febrile seizure, including past medical history, medications, allergies, vaccination history, a full review of systems, onset and characteristic of the fever, events leading up to the febrile seizure, characteristics of the seizure episode (duration, body movements, and recurrence), and potential sick contacts or exposures. A developmental history and family medical history is also important to assess for risk factors. The NP must be able to use the history to distinguish whether the child had a simple, complex, or status epilepticus episode and develop a list of differential diagnoses. It is important for the NP to understand that a febrile seizure is a diagnosis of exclusion, and therefore a detailed history to determine the need for further evaluation with diagnostic testing is necessary. Meningitis, encephalitis, or a space-occupying brain lesion should be considered in any child presenting with a fever and seizure.

#### Physical Examination

After a complete history has been conducted, a comprehensive examination should be performed to identify the cause of the fever. The NP must determine whether the child is clinically stable and his or her hydration status. It is important to assess the patient's airway patency, ventilation and oxygen adequacy, and circulatory status.<sup>10</sup>

A comprehensive neurologic examination should be conducted to ensure that the child is neurologically healthy. The neurologic assessment should

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