Journal of Population Therapeutics & Clinical Pharmacology

RESEARCH ARTICLE
DOI: 10.47750/jptcp.2023.30.06.057

Febrile Seizures in Children: What Do We Know?

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Submitted: 19 May 2023; Accepted: 08 June 2023; Published: 06 July 2023

Abstract

Febrile seizures (FS), which affect 2-5% of children, are the most common seizure disorder in childhood. Febrile seizures pose a significant challenge in pediatric practice due to their high prevalence in children and their tendency to recur. In the assessment of FS, medical practitioners focus on determining the underlying cause of the fever while simultaneously evaluating the child's overall health and developmental status. It is essential to differentiate febrile seizures from other types of seizures, as the latter may require different management approaches. This article provides an update on the current understanding of febrile seizures, along with an overview of their assessment and treatment.

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Introduction

Febrile seizures can be classified into two types: simple febrile seizures (70-80%) (SFS) and complex febrile seizures (20-30%) (CFS). A simple febrile seizure is defined as a brief (less than 15 minutes), generalized seizure that occurs in association with a fever exceeding 38°C (100.4°F). It does not recur within 24 hours, is not caused by an acute nervous system infection, and affects children aged six months to five years without any neurologic deficits or previous non-febrile seizures (1, 2). Although it is generally harmless and self-limited, it can be a distressing experience for parents. Complex febrile seizures are characterized by a prolonged seizure lasting more than 15 minutes, either focal or generalized, recurring more than once within 24 hours, and/or accompanied by postictal neurologic abnormalities, commonly referred to as postictal palsy (Todd's palsy), or neurologic deficits (1, 2).

Epidemiology:

Febrile seizures are most commonly observed in children between the ages of five months and five years, with the peak incidence occurring at 18 months. The majority of FS cases are simple, while approximately 20-30% of them are considered complex. Families with children affected by FS face a higher risk of epilepsy compared to the general population (3,4). In Western Europe and the United States, the maximum age for febrile seizure occurrence in children is 1.5 years, with prevalence rates ranging from 2% to 5%. Children with FS may come from various ethnic backgrounds, although certain groups, such as Indian (5-10%) and Japanese (6%) children, have a higher incidence. Only 6-15% of children experience their first febrile seizure after turning four, while 50% of all children with FS fall within the 12-30 months age range (3,4).

Etiology and pathophysiology

It is known that certain viruses can lead to FS. The viruses most frequently associated with FS in young children include influenza, rhinovirus, adenovirus, respiratory syncytial virus, rotavirus, enterovirus, and human metapneumovirus. There is a correlation between the development of FS and a number of vaccines, including MMR, rotavirus, diphtheria, pertussis, and tetanus vaccines, as well as the influenza virus vaccine. It is generally recognized that FS are induced by environmental exposure (the fever and its cause) and genetic predisposition, however the precise pathophysiology of these occurrences is unknown (4-6).

The height of the fever, rather than the rate at which the temperature rises, has been found to be the most crucial determinant in the development of a first febrile seizure (7, 8). In general, the higher the temperature, the more likely a febrile seizure may occur. The seizure threshold is lower in children who experience febrile seizures. The most common causes of fever in febrile seizures are viral illnesses such as influenza, roseola infantum, and viral upper respiratory tract infections (8).

Routine EEG and neuroimaging are not recommended for uncomplicated febrile seizures. However, any child who has a seizure and a fever and exhibits meningeal

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signs and symptoms (e.g., neck stiffness, Kernig and/or Brudzinski signs) or whose history or examination suggests the presence of meningitis or intracranial infection should undergo a lumbar puncture. Bacterial meningitis is uncommon in children under the age of 12 months, and lumbar puncture is not necessary for all children (2, 6).

Management and prognosis

Febrile seizures have a good prognosis; most children outgrow the disease by the age of six. In early childhood, about one-third of children will have a recurrence, but only about 10% of these children will have more than three fits. Over 75-90 percent of seizure recurrences occur within the first two years of life. The majority of children who experience febrile seizures grow and develop normally (1-3).

Treatment of acute seizures, excluding CNS infection, determining the origin of fever, prevention for future occurrences, and parental counseling are all part of the management of FS. Acute attack treatment: The majority of febrile seizures are self-limiting. Parents can use buccal or nasal midazolam (0.3 mg kg1, maximum dose 5 mg) or rectal liquid diazepam (0.5 mg kg1, maximum dose 10 mg) at home for seizures lasting more than two minutes (2).

Antipyretics increase the child's comfort but do not prevent febrile seizures. Similarly, there is little evidence that physical measures of temperature lowering (e.g., tepid sponging, direct fanning of the kid, chilling room, and removing clothing) are effective in preventing febrile seizures from reoccurring (6, 7).

Long-term prophylactic medication reduces the likelihood of seizure recurrence but has no effect on the risk of epilepsy in the future. It might be short-term or long-term. The American Academy of Pediatrics does not suggest intermittent or continuous prophylaxis due to the potential adverse effects of antiepileptic medicines (6, 7).

With at least one of the following, intermittent prophylaxis is recommended: (a) frequent seizures in a short period of time; 3 or more in 6 months, four or more in a year; (b) seizures lasting more than 15 minutes or requiring medications to halt seizures. Intermittent prophylaxis with rectal or oral diazepam for 2-3 doses during fever is sufficient to avoid recurrence (2, 6, 7).

The role of continuous prophylaxis is restricted. It is used when intermittent prophylaxis does not work or if the patient has a lot of complex febrile seizures. Valproic acid (10–15 mg/kg/day in divided doses) or phenobarbitone (5–8 mg/kg/day in divided doses for children under two years old and 3–5 mg/kg/day in divided doses for children over two years old) can be utilized. Because of the behavioral adverse effects of phenobarbitone, Valproic acid is preferable. Phenytoin and carbamazepine are ineffective. Prophylaxis is continued for two years after the last seizure or until the child reaches the age of 5, whichever comes first (1, 2, 9, 10).

Conclusion

Febrile seizures are the most common type of seizure in children under the age of five,

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involving 2–5% of children aged six months to five years. The majority of febrile seizures are simple, with only 20-30% being complex. Simple febrile seizures are normally harmless, but children who have complex febrile seizures are more likely to develop epilepsy later in life. More than 30% of children with febrile seizures will have another one throughout their early infancy. By the age of six, most children have outgrown the condition. To manage and anticipate FS, it is crucial to classify them according to their length and other characteristics. Pediatricians and neurologists need to be knowledgeable about FS care in order to prevent the inappropriate use of diagnostic techniques and therapies.

Conflicts of interest: There are no biomedical conflicts of interest to report.

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