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EM CASE OF THE WEEK

BROWARD HEALTH MEDICAL CENTER DEPARTMENT OF EMERGENCY MEDICINE

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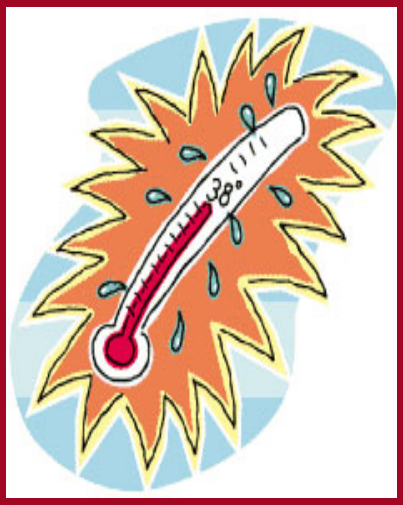

Febrile seizures are seizures that occur in young children and are triggered by fever. Although the majority of these seizures do not usually pose any long-term health problems, they can be particularly frightening for parents. It is important to know how to manage these types of seizures and how to provide parental reassurance and education.

EM CASE OF THE WEEK

EM Case of the Week is a weekly "pop quiz" for ED staff. The goal is to educate all ED personnel by sharing common pearls and pitfalls involving the care of ED patients. We intend on providing better patient care through better education for our nurses and staff.

Febrile Seizures

A 22 month old girl is brought to the ER by her parents, who state that 2 hours ago she had a 5 minute episode of whole body shaking and her temperature at home was 104°F. The parents state that their daughter had one episode of non-bloody, non-bilious diarrhea last night. She developed a fever early this morning, and a subsequent seizure that lasted 5 minutes. The parents are concerned, as she already had one prior febrile seizure a year ago. She is up to date with her immunizations. She is currently awake, alert, and shows no acute signs of distress. Temperature in the ER is 100.3°F, pulse is 150, respiratory rate is 22, and blood pressure is WNL. Physical examination is normal, with no focal neurologic deficits or meningeal signs observed. Rapid testing for influenza A and B is negative. Which of the following would be the most appropriate recommendation at this time?

A. Order an electroencephalogram

B. Order a stat head computed tomography scan

C. Admit the patient to the hospital for overnight observation

D. Begin treatment with phenobarbital

E. Reassure the parents that no additional workup is necessary at this point.

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Take Home Points

- Febrile seizures are fever-induced convulsions in children ages 6 months to 6 years. They are the most common type of seizure seen in childhood and are usually benign.
- As febrile seizures are usually brief and self-limited, no specific treatment is necessary in most cases. The management of these seizures focuses on seizure first aid and parental reassurance/education regarding long-term neurologic outcomes.
- Prophylactic use of anti-pyretic and anticonvulsant medications is not recommended
- To date, there is no evidence that indicates simple febrile seizures are associated with an increased risk of brain damage or cognitive impairment.

Febrile Seizures

The correct answer is E. A febrile seizure is defined as any seizure accompanying a fever due to a non-CNS cause, in patients between the ages of 6 months and 6 years. These seizures are generally considered benign events, and are not usually associated with serious acute or long-term neurologic complications. An electroencephalogram would be of use when a diagnosis of epilepsy is being considered, but is not a routine component of an evaluation of a neurologically healthy child with a simple febrile seizure. A CT is not indicated in the absence of focal neurologic deficits, papilledema or developmental abnormalities. Treatment with anticonvulsants is not usually initiated after one or more simple febrile seizures, due to concerns of potential side effects outweighing the benefits. Additionally, inpatient observation is not required.

Discussion:

As noted above, febrile seizures are convulsions accompanying a fever due to a non-CNS cause in children from the age of 6 months to 6 years old. While the majority of these seizures are generally benign, witnessing the seizure can be particularly distressing to the child's parents. Parents may think that their child is dying, and express concerns regarding brain damage and cognitive impairment. In order to provide high quality care to the patient and reassurance to the parents, it is important to be familiar with the presentation, diagnostic work up and management of this common type of childhood seizure.

So let's first discuss the two types of febrile seizures: simple febrile seizures are generalized, last less than 15 minutes, and do not recur within 24 hours. In contrast, complex febrile seizures are focal, may last for more than 15 minutes, and may recur within 24 hours. Of the patients who have a febrile seizure, the majority of them have the simple type, with the seizure occurring shortly after the onset of fever. *(cont'd next page)*

Epidemiology: In the United States, the prevalence of febrile seizures is 2% to 4%, with the highest incidence at 18 months of age and convulsions occurring more commonly during winter months. Risk factors for febrile seizures include family history, daycare attendance and developmental abnormalities. It has been posited that genetic factors also play a role in susceptibility to this type of seizure, involving mutations to the $GABA_A$ receptor in the CNS. Additionally, infection with human herpes virus type 6 (HHV6) has also been noted to be associated with febrile seizures.

Diagnosis: Initial workup of a febrile seizure includes a thorough history and careful physical examination, including neurologic assessment, in order to identify a source of fever. A "must not miss" case is a CNS infection, such as meningitis or encephalitis. Depending on clinical circumstances, there are multiple components which comprise the evaluation of a child who has had one or more febrile seizures:

- *Lab studies* – not indicated unless done as part of a search for the source of fever; blood cultures and CBC are not routinely needed, as patients with febrile seizures have an incidence of bacteremia similar to febrile patients without seizures
- *Imaging* – not part of a routine evaluation of a child with first-time simple seizure; CT or MRI might be considered in a child with complex febrile seizures, significant focal neurologic deficits, underlying developmental abnormalities or structural lesions
- *Lumbar puncture* – in 2011, the American Academy of Pediatrics updated guidelines regarding LPs in children with febrile seizures. If the child also presents with signs and symptoms of meningitis, LP is recommended; if the child has been pretreated with antibiotics, LP is considered an option, due to the potential masking of the signs and symptoms of meningitis; additionally, if the child is 6 to 12 months old and hasn't received the Hib or pneumococcal vaccines, LP is an option.

Management: Most febrile seizures are brief and self-limited, with no permanent brain damage. Initial management consists of maintaining a clear airway and providing supplemental oxygen as needed. For seizures lasting more than 10 minutes, intravenous diazepam can be given to halt the seizure (0.2-0.5 mg/kg of body weight); rectal diazepam may also be given (0.5 mg/kg body weight).

Many physicians recommend a vigilant approach to control fever, including the use of antipyretic agents to prevent recurrent febrile seizures. However, there is no compelling evidence that the use of these medications will help prevent a recurrence. A study conducted in Finland randomized children to receive acetaminophen (10 mg/kg) or placebo for 2 years following a first febrile seizure. Children receiving acetaminophen had recurrent febrile seizures during 5.2% of febrile illnesses, compared with 8.2% for those receiving placebo. Similarly, there is no reason to treat children with prophylactic anti-convulsants for prevention of recurrent febrile seizures. A Cochrane Database Systematic Review in 2013 concluded that no clinically important benefits for children with febrile seizures were found with prophylactic oral or rectal anti-convulsant medication use. Adverse effects of these drugs were reported in up to 30% of children. The review concluded that parents should be provided with practical advice and reassurance regarding the benign nature of febrile seizures.

Prognosis: To date, no studies have demonstrated that febrile seizures can lead to brain damage or cognitive impairment. The National Collaborative Perinatal Project studied 431 children who had experienced a febrile seizure, and their siblings who were seizure free. The children were tested at age 7 for overall intelligence and academic achievement. In the children who were known to be normal before the first febrile seizure, there was no difference in intelligence or school achievement between these children and their seizure-free siblings.

Liu, Z, Geyer, JD, Carney, PR. (2010) Febrile Seizures. In PR Carney, JD Geyer (Eds.), *Pediatric Practice: Neurology* (Chapter 4). New York, NY: McGraw-Hill

Randel, A. AAP Updates Guidelines for Evaluating Simple Febrile Seizures in Children . *Am Fam Physician* 2011;83(11):1348-1350.

Takeoka, M. (2011). Febrile Seizures. In CD Rudolph, AM Rudolph, GE Lister, LR First, AA Gershon (Eds.), *Rudolph's Pediatrics, 22nd edition* (Chapter 559). New York, NY: McGraw-Hill

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This month's case was written by Helen McLaughlin. Helen is a 4th year medical student from FIU-HWCOM. She did her emergency medicine rotation at BHMC in December 2015. Helen plans on pursuing a career in Psychiatry after graduation.