BC Children’s Hospital
Division of Pediatric Emergency Medicine
Clinical Practice Guidelines

FEBRILE SEIZURES
in the Emergency Department

AUTHORS:

Ran D. Goldman, MD
Division of Pediatric Emergency Medicine
Department of Pediatrics, University of British Columbia
BC Children’s Hospital
Child & Family Research Institute (CFRI)
4480 Oak Street
Vancouver, British Columbia
Canada V6H 3V4
rgoldman@cw.bc.ca

Kevin Farrell
Division of Neurology
Department of Pediatrics, University of British Columbia
British Columbia’s Children’s Hospital
4480 Oak Street
Vancouver, British Columbia
Canada V6H 3V4
Kevin_farrell@telus.net

CLINICAL PRACTICE GUIDELINE
TASK FORCE:

CHAIRMAN:
Paul Korn. MD FRCP(C)
Clinical Associate Professor
Head, Division, General Pediatrics
Department of Pediatrics, UBC

MEMBERS:
TBD

CREATED:
September, 2007

LAST UPDATED:
September 20, 2007

FIGURES:
1
KEY POINTS:

1. Febrile seizures (simple and complex) are almost always benign and generally are not associated with neurological consequences.
2. The mainstay of investigation and treatment is to rule-out bacterial meningitis.
3. There are limited indications for investigations including blood work, neuroimaging or electroencephalography (EEG).
4. Clear explanation to and reassurance of caregivers is key in the management of the child.

Febrile seizures have been defined as “an event in infancy or childhood, usually occurring between 3 months and 5 years of age, associated with fever but without evidence of intracranial infection or defined cause”¹. They are the most common type of seizure and occur in approximately 3-5% of children ², ³ although a higher incidence up to 14% has been described in Asia⁴.

Seizures may occur prior to the onset of the fever or with only a mild fever, but usually the temperature is greater than 38.5°C. There is, however, a correlation between lower temperature and a shorter duration of fever before the initial febrile seizure and an increased risk of recurrence of febrile seizure.⁵

Investigation

A febrile seizure must be distinguished from a seizure due to a acute infection such as bacterial meningitis that requires urgent investigation and treatment. Bacterial meningitis has been demonstrated in 1.8 – 5.4% of children presenting with a febrile seizure, ⁶ but with recent additions of available vaccines the incidence of bacterial meningitis will likely be smaller.

The current recommendation is that lumbar puncture (LP) be performed if meningeal signs are present, be strongly considered if the child is less than 12 months of age or had received antibiotics prior to the seizure, and be considered if the child is less than 18 months of age.⁶ A thorough history and physical exam by an experienced clinician is required to determine possible bacterial meningitis.

Other diagnoses to be differentiated from simple febrile seizure include: encephalitis, gastroenteritis due to Shigella Sp., ingestions (such as diphenhydramine, tricyclic antidepressants, amphetamines, and cocaine), electrolyte abnormalities, hypoglycemia, and head injury (both accidental and abusive)

Investigations

Blood Work

Routine blood work is not indicated for simple febrile seizures.⁷ Laboratory investigations should be dictated by the clinical condition of the child and by an appropriate clinical policy for children of that age presenting to the emergency department with fever.

Urine

A urinalysis is recommended for patients with no obvious focus of infection.

Lumbar Puncture
An LP should be strongly considered in all infants less than 12 months of age with no clear source for fever, as the signs of meningitis may be difficult to identify in this age group. An LP should be considered in children between 12 months to 18 months of age.

Partially treated meningitis must be considered in children who are on antibiotics prior to the seizure, and an LP should be considered regardless of age. Even if an LP is performed and the results are negative, one may consider treatment of meningitis, as CSF may be normal in the early stages of meningitis. LP should not be considered for children the responsible physician considers unstable haemodynamically.

Imaging

Neuroimaging is not indicated after a simple febrile seizure but should be considered when there are clinical features of a neurological disorder, e.g., micro/macrocephaly, neurocutaneous abnormalities, pre-existing neurological deficit, and postictal neurological deficit persisting for more than a few hours, or when there are recurrent complex febrile seizures, particularly where there is doubt whether the seizures are febrile. Magnetic resonance imaging is more sensitive than computed tomography for brain disorders that may present with seizures.

Electroencephalography

EEG is not helpful in the detection of children with simple febrile seizures who are likely to develop an a-febrile seizure. Epileptiform abnormalities are relatively common in children with benign febrile seizures. EEG has a low sensitivity in children under three years of age following an unprovoked seizure. EEG may have some role, albeit limited, in the diagnosis of acute encephalopathic disorders if the child remain encephalopathic for longer than normal following a febrile seizure.

Treatment

Most febrile seizures are brief and the seizure has stopped prior to presentation in the Emergency Department. If the seizure has not stopped, treatment with intravenous diazepam or lorazepam is warranted. Rectal diazepam (0.5 mg/kg) or lorazepam (0.1 mg/kg) should be administered if intravenous access cannot be established readily. There have been no controlled studies of buccal midazolam in febrile seizures but buccal midazolam (0.5 mg/kg; max dose 10 mg) was more effective than rectal diazepam for children presenting to hospital with acute seizures and was not associated with an increased incidence of respiratory depression.

The next step in management is to exclude a serious underlying cause, such as bacterial meningitis. The characteristic features of meningitis may be masked in children under 18 months of age and those who have received antibiotics.

An integral part of the management of a first febrile seizure is helping the family to cope with a frightening experience. Parents may believe that their child is dying during a first febrile seizure. The challenge is to help the family deal with the emotional trauma and to understand the excellent prognosis. It is important that the family understand that there is no increased risk of intellectual delay or school difficulties and that febrile seizures less than 30 minutes do not result in brain damage. The family should be provided with information relating to the risk of recurrence during the same illness or in the future and how to deal with subsequent seizures. The family should be taught about the low risk of developing epilepsy and the lack of benefit of using antiepileptic drug treatment in altering that risk. This information should be discussed with the family when the child is seen at the time of the febrile seizure. The family should also receive “Febrile Seizure” information as a handout before leaving the Emergency Department.
The risk of recurrence after the first febrile seizure is about 33%, and about 9% will have three or more episodes of a febrile seizure. Half of the children will have another febrile seizure during a febrile illness in the following year.

Several factors increase the likelihood of recurrence and include: first febrile seizure at a young age; family history of febrile seizures; short duration of fever before the seizure; relatively low fever at the time of the initial seizure. There seems to be a genetic predisposition for febrile seizures as the risk for other siblings to develop febrile seizures is about 10-20%, but may be higher if the parents also have a history of febrile seizures themselves.

There is no evidence that treatment of simple febrile seizures can prevent later development of epilepsy or that there is any structural damage or higher risk of subsequent cognitive decline.

A small proportion of children will have multiple febrile seizures. Continuous prophylaxis with antiepileptic medications is not recommended, and intermittent administration of antipyretics was not found to be effective. There is a lack of consensus regarding the efficacy of intermittent diazepam, and the efficacy of midazolam as an intermittent prophylactic agent should be investigated. Therefore, intermittent prophylactic therapy to prevent recurrent febrile seizures cannot be recommended at this time, pending further research. Instead, emphasis should be placed on parent education and reassurance, as febrile seizures are a frightening, stressful experience for the parent.

**Admission**

The decision to admit a patient with febrile seizure is mostly related to the source of the fever. In general, children with a simple febrile seizure can be discharged from the Emergency after explanation and reassurance of the caregivers. Indications for admission may include:

1. Undifferentiated infection and possible meningitis or encephalitis;
2. Treatment of infections other than meningitis or encephalitis; or
3. Significant caregiver anxiety and concerns of coping with a recurrent seizure at home.
Other Sources

BC Children’s Emergency - www.bcch.bc.ca
www.epilepsy.com/epilepsy-febrile.html;
http://www.patient.co.uk/showdoc/23068735/
REFERENCES


