Febrile Seizures

Most common convulsive event in childhood.

**ILAE DEFINITION**

Seizures occurring in childhood after the age of 1 month, usually between 3 months and 6 years of age in association with a febrile illness, not caused by an infection of the central nervous system, without previous neonatal or unprovoked seizure and not meeting the criteria for other acute symptomatic seizures.

*(It is very important to make an accurate diagnosis in a child <6 months, as signs and symptoms of CNS infection may differ to those of the older child).*

**DEMOGRAPHICS**

- **Prevalence:** Approximately 2-5% but there is a wide geographical variation.
- **Age of onset:** After the age of 1 month, usually between 3 months and 6 years. Nearly 90% have first febrile seizure before the age of 3.
- **Caution:** One must be very careful to exclude treatable causes in the infant <6 months (e.g. meningitis).
- **Sex:** Male female ratio – 1:1
- **Aetiology:** Unknown but felt to be related to a combination of immature brain, fever and genetic predisposition. A family history of febrile seizure is reported in about 15-20% of cases.

**SYMPTOMS AND SIGNS**

**Seizure Semiology:**

- Simple febrile seizure (~60-70%) and complex febrile seizure (~30-40%):
  - Simple febrile seizure: Brief (<15 minutes), generalised tonic clonic seizure and a single seizure per illness
  - Complex febrile seizure: Focal, prolonged (>15 minutes) or multiple per illness

Focal features are described in about 4-16% of febrile seizures.

**Predictors of recurrence:**

About 30-40% of children with first febrile seizure will have at least one recurrence, mostly (~75%) within a year of first febrile seizure:

- Younger age (<12mo) of first seizure onset is associated with a recurrence risk close to 50%
- Family history of febrile seizure (first degree relative) is associated with approximately 25% increment in the absolute risk of a recurrent febrile seizure
- Low temperature at the time of the seizure
- Short duration of illness before seizure

Presence of all four risk factors are associated with about 76% chance of seizure recurrence compared to ~4% chance without any risk factors.

**Risk for subsequent epilepsy:**
The vast majority of children who present with febrile seizure will not develop epilepsy
Risk factors for epilepsy include - complex febrile seizures, neurodevelopmental abnormality and family history of epilepsy
Each of the individual components of complex febrile seizure is a risk factor for developing epilepsy
For children with all three features of a complex febrile seizure, the risk increases to ~49%. This is a very small percentage of all children with febrile convulsions.
Children with no risk factors have a ~2.4% chance of developing afebrile seizures by 25 years compared with ~1.4% for the general population

**FEBRILE STATUS EPILEPTICUS (FSE)**

Febrile status epilepticus occurs in about 5% of children with febrile seizures and are more likely to be focal.
It occurs in very young children (median age 1.3 yr) and is usually the first febrile seizure
A prolonged febrile seizure is a risk factor for further prolonged attacks
Compared with children with simple febrile seizure, FSE is associated with: younger age, lower temperature, longer duration (1-24 hours) of recognized temperature before febrile seizure, female sex, structural temporal lobe abnormalities, developmental delay and first-degree family history of febrile seizure
A prospective randomised study (FEBSTAT) demonstrated acute hippocampal injury (MRI T2 signal abnormality) in 11.5% of children with febrile status and it was noted to be significant compared to simple febrile seizures (p<0.0001). This cohort is being followed up in the long term. Evolution to hippocampal sclerosis was seen in a subset.

**INVESTIGATIONS**

**Lumbar puncture:**
- Needs to be considered if safe and when clinically indicated
- About 15% of children with meningitis will have a seizure but the majority are not neurologically normal shortly after the seizure
- Meningitis is reported in up to 18% of children with febrile status epilepticus

**Neuroimaging:**
- Imaging in simple febrile seizures is, as a rule, not indicated.
- In complex febrile seizures, consider acutely whether it is clinically indicated, that is, if an underlying structural lesion or CNS process is suspected in the differential.

**EEG:**
- No consistent evidence for routine EEG to predict subsequent epilepsy or febrile seizure recurrence, including complex febrile seizures and febrile status epilepticus

**PROGNOSIS**

The overall cognitive outcome is good, but the Febstat study (2017) has shown despite overall average intellectual functioning, children with a history of FSE are at risk for memory impairment when they present with acute hippocampal injury, abnormal hippocampal development, or focal seizures.

**MANAGEMENT OPTIONS**

- Parental counselling. This is critical.
- **Acute management of seizure**
- Prophylactic treatment is generally not indicated
- Some efficacy is reported with Phenobarbitone and Valproic acid as prophylaxis but rarely indicated and not generally suggested by authorities
- There is convincing evidence that antipyretics are not effective in preventing febrile seizure recurrence
DIFFERENTIAL DIAGNOSIS

- Dravet syndrome
- GEFS+ syndrome
- Other generalized epilepsies

REFERENCES:


