EUROPEAN ACADEMIC RESEARCH
Vol. IV, Issue 8/ November 2016

Impact Factor: 3.4546 (UIF)
DRJI Value: 5.9 (B+)

ISSN 2286-4822
www.euacademic.org

# Febrile convulsions in children. Review Innovation and development in childish age and beyond

VIOLA GAVANI MD MSC
Neuropediatrician
Lecturer at LOGOS University Tirana, Albania

**Abstract:**

*Febrile seizures are a frequent disease and trauma in children, they appear at the age of childish to 5 years of age and recent research have discovered a type of febrile convulsions after this age associated with genetic changes.*

*The purpose of this review is to update physicians on the disease.*

*Method: Research update of world literature about the disease*

*Results come to update doctors and parents to the disease.*

**Key words:** febrile convulsion, children.

Pediatric febrile convulsions, which represent the most common disorder of childhood, exist only in conjunction with a high fever. Evidence suggests, however, that they have little to do with cognitive function, so the prognosis for normal neurological function is excellent in children with febrile convulsions. (1,3,4)

Epidemiological studies have led to the division of febrile convulsions in 3 groups as follows:

Simple febrile seizures

Complex febrile seizures

Symptomatic febrile convulsions

## SIGNS AND SYMPTOMS (2)

### Simple febrile convulsion

The disease is a fever in children aged 6 months to 5 years. Single convulsion is generalized and lasts less than 15 minutes. The child is neurologically healthy and without neurological abnormalities review or story development. Fever (disease) is not caused by meningitis, encephalitis, or any other disease that affects the brain.

The disease is described by generalized convulsions toniko- clonic Complex febrile disease Age, prior neurological disease, and fever are the same as for the simple febrile convulsion This seizure is either plane or prolonged (ie,> 15 min).(7) Symptomatic febrile convulsion diagnosis No specific laboratory studies have shown that a simple febrile seizure. Doctors should instead focus on the diagnosis of the cause of fever. About lumbar puncture, the following should be kept in mind: Many professionals consider lumbar puncture in children younger than 12 months, because the signs and symptoms of bacterial meningitis may be minimal or absent in this age group. Lumbar puncture should be considered in children aged 12-18 months, because the signs and symptoms of bacterial meningitis can be subtle clinical trials in this age group In children older than 18 months, the decision to perform lumbar puncture is based on clinical suspicion of meningitis Management Based on the analysis of the risk / benefit, Anticonvulsants no permanent therapy is indicated for children who have experienced one or more simple febrile convulsions. (5) If, however, to prevent subsequent febrile convulsions is essential topic, oral diazepam will be the treatment of choice. It can reduce the risk of recurrence of febrile convulsions and, because it is permanent, probably it has negative effects. Clinic Febrile seizures are the most common disorder in childhood. (5)Since the early 20th century, people have debated whether these children will benefit from daily therapy anticonvulsants.

Epidemiological studies have led to the division of febrile convulsions in 3 groups as follows: simple febrile seizures, complex febrile convulsions, symptomatic and febrile convulsions. Simple febrile convulsion Placement is a fever in children aged 6 months to 5 years. Single convulsion is generalized and lasts less than 15 minutes. The child is neurologically healthy and without neurological abnormalities review or story development. Fever (convolution) is not caused by meningitis, encephalitis or other diseases affecting the brain. Complex febrile It is age, neurological status before illness and fever are the same as for simple febrile convulsion. This seizure is either focal or prolonged (ie,> 15 min).(8)Febrile symptomatic disease Age and fever are the same as for simple febrile convulsion. The child has a pre-existing neurological abnormalities or acute disease. Patofisiologjia This is a unique form of epilepsy that occurs in early childhood and only in association with altitude temperature. The basic pathophysiology is unknown, but genetic predisposition qrate contributes to the occurrence of this disorder. Frequency United States Febrile seizures occur in 2-5% of children aged 6 months to 5 years in industrialized countries. Among children with febrile convulsions, about 70-75% have only simple febrile convulsions, 20-25% have complex febrile seizures, and about 5% have symptomatic febrile convulsions.

## MORTALITY AND MORBIDITY

Children with a previous seizure simple febrile are at increased risk of recurrent seizures with fever; this occurs in about a third of cases.

• Children younger than 12 months at the time of their first convulsion simple febrile have a 50% probability of having a second convulsion. After 12 months, the probability decreases to 30%.

• Children who have simple febrile convulsions are at an increased risk for epilepsy. The rate of epilepsy by age 25 years is approximately 2.4%, which is about two times the risk in the general population.

• The literature does not support the hypothesis that simple seizures affect the intelligence of the child (ie, cause a learning disability), or are associated with increased mortality .

Men have a slightly higher incidence of febrile convulsions. Simple febrile convulsions occur more often in children aged 6 months to 5 years. Children with simple febrile seizures are neurologically healthy before and after convulsions They do not experience a convulsion in the absence of fever.

Convulsions are described as either a stroke or seizure generalized generalized tonic - clonic.

Signs of a focal convulsions during early or postictal period (eg, initial clonic movements of a limb or limbs on one side, would exclude a simple fever seizure.

Similarly, in simple febrile convulsion activity does not continue for more than 15 minutes, although a period of confusion may extend beyond a maximum of 15 minutes.(10)

Simple febrile seizures often occur with the initial height temperature in the onset of disease. Convulsion may be the first indication that the child is sick. While no clear cuts is known, a rectal temperature below 38 ° C should raise concern that the event was not a simple febrile seizure.

## PHYSICAL EXAMINATIONS

Physical findings may reveal a children neurologically and healthy development. It is particularly important that the child has no signs of meningitis or encephalitis (eg, stiff neck, or changes in constant mental status).

• Differential Diagnosis
• Acute Disseminated Encephalomyelitis
• Management of Acute Stroke

- Anterior Circulation Stroke
- aseptic meningitis
- basilar Artery thrombosis
- Benign Childhood Epilepsy
- Complex Partial Seizures
- Epilepsy and Seizures
- Generalized Tonic-Clonic Seizures
- Meningococcal meningitis
- Neonatal Meningitis
- Neonatal Seizures
- Partial epilepsy

**First Pediatric seizure**

**Laboratory studies**

No specific studies for a simple febrile seizure. Doctors should focus on diagnosing the cause of fever. Other laboratory tests may be indicated by febrile nature of the underlying disease. For example, a child with severe diarrhea may benefit from studies of blood electrolytes.

**Tests**

EEG is not indicated in children with simple febrile convulsions. Published studies show that most of these children have a normal EEG. In addition, some of those with an abnormal EEG seizures have remained for the duration of their follow-up. On the other hand, some children with a first EEG.

Normal people have experienced one or more seizures in EEG subsequent febrile event. Finally, there is no evidence to show that starting Anticonvulsants therapy for a child with simple febrile seizures and abnormal EEG will change the outcome of the child.

Most consider lumbar puncture in children younger than 12 months, because the signs and symptoms of bacterial meningitis may be minimal or absent in this age group.

Lumbar puncture should be considered in children aged 12-18 months, because the signs and symptoms of bacterial meningitis can be subtle clinical trials in this age group.

In children older than 18 months, the decision to perform lumbar puncture is based on clinical suspicion of meningitis.

Continuous therapy with phenobarbital or valproate ul Na subsequent emergence of febrile convulsions.

Both therapies provide significant risks and potential negative effects, and add simple febrile seizures have no proven danger.

These medications are not recommended, as does the potential benefits outweigh the potential risks.

There is no evidence that any therapy administered after the first simple convulsion will reduce the risk of a subsequent convulsion febrile event or the risk of recurrent febrile event (eg, epilepsy).

Diazepam orally can reduce the risk of subsequent febrile convulsion. Because it is permanent, this therapy may have minimal negative effects. If subsequent prevention of febrile convulsions is essential, this will be the treatment of choice.

Although this does not prevent febrile convulsions simple, antipyretic therapy is desirable for other reasons.

Many practitioners have described rectal diazepam for patients with febrile seizures, febrile convulsions especially ones that last more than 5 minutes supporting safety and efficacy against convulsions. After a review of seven randomized studies, the researchers concluded that or benzodiazepine midazolam, administered intranasally, is as safe and effective as intravenous diazepam or colon in pediatric emergency treatment of acute convulsive. The results are based on the administration of 0.2 mg / kg intranasal midazolam versus 0.2-0.5 mg / kg if intravenous (4 trials) or rectal (3 trials) diazepam for emergency treatment of epileptic having a first

action of less than 5 minutes. Patients in the study were aged 18 or younger.

## Drugs (10)

### Benzodiazepines

These agents have activity antikonvulsion and act swiftly in acute crisis.

The oral diazepam can reduce the number of subsequent febrile seizures when given at any febrile episode. Many practitioners will prescribe diazepam rectal, especially for patients who have had prolonged febrile convulsions, to prevent future episodes of febrile seizures and status.

A study reported in the New England Journal of Medicine diazepam oral therapy continued until the child was febrile event for 24 h. However, this seems excessive.

### Prognosis

The prognosis for normal neurological function is excellent.(11)

About a third of children who experience a single seizure simple febrile will have another.

Lifetime rate of epilepsy in these children is slightly higher than the general population.

A study of population-based Danish NORGAARD et al studied the connection between health care data and the data of Danish men born from 1977-1983 showed that 18.276 people from 507 (2.8%) had a record of hospitalization with febrile convulsions and no known history of epilepsy. Compared with recruits no written record of febrile convulsions, according to the test report Prien BOERGE intelligence test terminal was 1:08 quartile (95% confidence index [CI], 0.94 to 1.25). Adjusted prevalence ratios were 1:38 (95% CI, 1.07 to 1.79) for febrile convulsions with a starting age 3 months to <1 year, 0.98 (95% CI, 0.80 to 1.18) for febrile convulsions starting with 1- 2 years

of age, and 1:14 (95% CI, 0.79 to 1.66) for a beginning age 3-5 years.(16)

**Patient Education**

Parents should be informed that these dramatic events show no neurological dysfunction or disease future.

**Epilepsy seizures with fever plus GEFS +**

Fever connection, mutations, phenotype and genetics

**Presentation of scientific disease**

Generalized epilepsy with febrile seizures plus (+) GEFS autosomal syndrome is an autosomal, dominant disorder where individuals specified, can display epilepsy, and multiple fenotype. GEFS + can continue beyond early childhood (ie, 6 years). (13)GEFS + also now believed to include three other epileptic disorders :. Epilepsy grievous mioklonike of infancy (SMEI), which is also known as syndrome Drava syndrome border SMEI (SMEB), and epilepsy that difficult to childhood (IEC) [2] [3] There are at least six types of GEFS + , defined by their find. Known genes are sodium channel subunit genes SCN1A α, ß subunits SCN1B, and a GABA receptor γ, GABRG2 and another calcium channel gene associated with PCDH19 which is also known as Female epilepsy with mental retardation. Penetrance for this disorder is estimated at around 60% Signs and symptoms GEFS + individuals have present a series of epilepsy phenotypes. These include febrile convulsions that end by age 6 (FS), such convulsions that extends beyond the age of 6 may include attacks tonic-clonic febrile event, mioklonike, absensen, convulsions and epilepsy clumsy mioklonik-unstable. Individuals can also submit with SMEI,(15,16) characterized by tonic-clonic crisis generally, towards the development of impaired psychomotor, mioklonike seizures, ataxia, and poor response to many epileptic drugs GEFS + type 1 is a subtype of GEFS + in which there SCN1B

mutations in a gene encoding a sodium channel subunit ß. (19,20,21)B subunit is necessary for the proper channel inactivation. There are two known mutations that lead to GEFS SCN1B +. The first and best characterized of these mutations is C121W A second mutation was found in a tribe with GEFS + type 1.(17)

**Type 2**

A second GEFS + subtype, type 2,(14) is the result of mutations in SCN1A, a gene encoding a sodium channel alpha subunit. Currently there are about 90 known mutations in the gene SCN1A. These mutations result in almost any type of mutation of the gene. The results of these mutations are highly variable, some channels are functional, while others result in non-functional channels. Some channels hyperexitability functional result in the membrane, while others result in hypoexitability. Most functional mutant channels may result in hyperexitability. An example of this is the mutation D188V.

Dysfunctional channels produce similar changes in exitability cell. Likewise, many of meaningless nonsense mutations are likely to result in non-functional channels and hypoexitability, although this has not yet been tested. It is also unclear how this leads to the membrane hypoexitability GEFS + phenotype.

**Type 3**

GEFS + patients have mutations in type 3 GABRG2 gene,(18) which encodes the γ2 GABA subunit mutation was first discovered in GABRG2 K289M in the extracellular region. Because of these results, it is believed that GEFS + phenotype in these individuals is the result of hyperexitability.

In line with previous mutation, a second group found a second mutation associated with GEFS GABRG2 +. This mutation is R43Q.

Benzodiazepines, such as diazepam, empower GABA. This is effectively abolished in cells expressing mutant subunit R43Q instead of wild type γ subunit. This mutation does not affect the ability to coegzistence  subunit receptors that to function as it still provides resistance to GABA. As with previous mutation, the mutation is expected to result in nervous hyperexitability.

GEFS known final 3 + type mutation is a nonsense mutation, Q351X, located in the region it is localized intracellularly in the endoplasmic reticulum of the cell membrane in place. As with other known GEFS + 3 mutation type, Q351X likely to result in nerve hyperexitability.

**Mutations SCN2A**

The final type GEFS + is caused by mutations in the gene SCN2A, which encodes a sodium channel alpha subunit. The first mutation on this gene is R187W, located in the intracellular region. Patients with this mutation may have two types of febrile seizures and febrile event. Electrofiziologjik review of this mutant revealed that it increases the time constant for inactivation, presumably by increasing the level of sodium leading to hypereksiitabilitet. The second mutation known regarding GEFS SCN2A + is R102X. This mutation is located in the N terminal intracellular and resulted in SMEI patients. The result of this mutation is completely non-functional channels and membrane hypoeksitabiliteti Management Long-term management is the use of drugs Anticonvulsants, especially valproate Na, stiripentol, topiramate, clobazam or ketogjenike diet they are also found useful in certain cases Management of convulsions in progress is the benzodiazepine like midazolam. methods

We check all patients with a diagnosis GEFS +, comprising control presentation of clinical signs and treatment and follow.

We will see the type of mutation that is found, compared with phenotype for each child.

## CONCLUSION

Febrile seizures are a frequent disease and trauma in children, they appear at the age of childish to 5 years of age and recent research have discovered a type of febrile convulsions after this age associated with genetic changes. How fever is related with epilepsies remain to be clarified.

## REFERENCES

1. Oehler, K & Tingle, LE (Jan 15, 2012). "Febrile seizures: risks, evaluation, and prognosis". American family physician. 85 (2): 149–53
2. "Symptoms of febrile seizures". www.nhs.uk. 01/10/2012. Retrieved 13 October 2014.
3. Paritosh Prasad (2013). Pocket Pediatrics: The Massachusetts General Hospital for Children Handbook of Pediatrics. Lippincott Williams & Wilkins. p. 419. ISBN 9781469830094.
4. Patterson, JL; Carapetian, SA; Hageman, JR; Kelley, KR (Dec 2013). "Febrile seizures.". Pediatric annals.42 (12): 249–54.
5. Ronald M. Perkin, ed. (2008). Pediatric hospital medicine : textbook of inpatient management (2nd ed.). Philadelphia: Wolters Kluwer Health/Lippincott Williams & Wilkins. p. 266. ISBN 9780781770323.
6. Nakayama J, Arinami T (August 2006). "Molecular genetics of febrile seizures". Epilepsy Res. 70 Suppl 1: S190–8.
7. David A. Greenberg; Michael J. Aminoff; Roger P. Simon (2012). "12". Clinical neurology (8th ed.). New York: McGraw-Hill Medical. ISBN 978-0071759052.
8. Engel, Jerome (2008). Epilepsy : a comprehensive textbook (2nd ed.). Philadelphia: Wolters Kluwer

Health/Lippincott Williams & Wilkins. p. 661. ISBN 9780781757775.

9. Ahmad, S; Marsh, ED (September 2010). "Febrile status epilepticus: current state of clinical and basic research.". Semin Pediatr Neurol. 17 (3): 150–4.
10. Offringa, M; Newton, R (Apr 18, 2012). "Prophylactic drug management for febrile seizures in children". The Cochrane database of systematic reviews. 4: CD003031.
11. Shinnar, S; Glauser, TA (January 2002). "Febrile seizures". Journal of child neurology. 17 Suppl 1: S44–52
12. Vestergaard M, Pedersen MG, Ostergaard JR, Pedersen CB, Olsen J, Christensen J (August 2008). "Death in children with febrile seizures: a population-based cohort study". Lancet. 372 (9637): 457–63
13. Scheffer I, Berkovic S (1997). "Generalized epilepsy with febrile seizures plus. A genetic disorder with heterogeneous clinical phenotypes". Brain. 120 (3) (3): 479–90.
14. Spampanato J, Escayg A, Meisler M, Goldin A (2003). "Generalized epilepsy with febrile seizures plus type 2 mutation W1204R alters voltage-dependent gating of Na(v)1.1 sodium channels". Neuroscience 116 (1): 37–48.
15. Singh R, Andermann E, Whitehouse W, Harvey A, Keene D, Seni M, Crossland K, Andermann F, Berkovic S, Scheffer I (2001). "Severe myoclonic epilepsy of infancy: extended spectrum of GEFS+?". Epilepsia 42 (7): 837–44.
16. Scheffer, Ingrid et al. (2007). "Epilepsy and mental retardation limited to females: an under-recognized disorder". Brain: A Journal of Neurology (Oxford Journals) 131 (4): 918–927.
17. Wallace R, Wang D, Singh R, Scheffer I, George A, Phillips H, Saar K, Reis A, Johnson E, Sutherland G, Berkovic S, Mulley J (1998). "Febrile seizures and

generalized epilepsy associated with a mutation in the Na+-channel beta1 subunit gene SCN1B". Nat Genet 19 (4): 366–70.

18. Rhodes T, Vanoye C, Ohmori I, Ogiwara I, Yamakawa K, George A (2005). "Sodium channel dysfunction in intractable childhood epilepsy with generalized tonic–clonic seizures". J Physiol 569 (Pt 2): 433–45.
19. Meadows L, Malhotra J, Loukas A, Thyagarajan V, Kazen-Gillespie K, Koopman M, Kriegler S, Isom L, Ragsdale D (2002). "Functional and biochemical analysis of a sodium channel beta1 subunit mutation responsible for generalized epilepsy with febrile seizures plus type 1". J Neurosci 22 (24): 10699–709
20. Lucas P, Meadows L, Nicholls J, Ragsdale D (2005). "An epilepsy mutation in the beta1 subunit of the voltage-gated sodium channel results in reduced channel sensitivity to phenytoin". Epilepsy Res 64 (3): 77–84.
21. Audenaert D, Claes L, Ceulemans B, Löfgren A, Van Broeckhoven C, De Jonghe P (2003). "A deletion in SCN1B is associated with febrile seizures and early-onset absence epilepsy". Neurology 61 (6): 854–6