

## Recurrence of Febrile Convulsions

Taslim S. Soetomenggolo

(Department of Child Health, Medical School,  
University of Indonesia, Jakarta)

**ABSTRACT** During two years, 92 patients who experienced first febrile convulsion were followed-up in the Pediatric Neurology Clinic, Department of Child Health, Cipto Mangunkusumo Hospital, Jakarta for at least one year. Of the 92 patients 58 (63%) were males and 34 (37%) females. Most of the patients were less than 4 years, and only 6 patients (6,5%) aged more than 4 years. Eight (8,7%) of the 92 patients suffered from recurrence of febrile convulsions, and in 5 of them the recurrence occurred within the first 6 months of follow-up. The recurrences of febrile convulsions occurred mostly in patients less than one year of age, those with tonic seizures, those with neurological disorders, and those who had history of epilepsy in their family. In this study the occurrence of recurrent febrile convulsions in patients with normal EEG was higher than that in patients with abnormal EEG. [*Paediatr Indones* 1995; 35:118-123]

### Introduction

Febrile convulsion is 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 other definable cause. Children with previous afebrile seizures are excluded, as are those who suspected to have seizures in the first four

four weeks of life.<sup>1,2</sup> Approximately 30 to 37% of patients with febrile convulsion will experience at least one recurrence.<sup>3</sup> Half of the children with one recurrence will experience further attack.<sup>4</sup> In most cases, the number of recurrences is limited to 2 or 3, only 9-17% of patients experience more than 3 recurrences. Half of the recurrences take place within 6 months of the initial episode, and three-quarters of all recurrences have occurred by 1 year.<sup>5</sup>

Recurrences are probably more common in younger babies, children with an abnormal developmental history, or a fa-

Accepted for publication: November 23, 1994. Author's address: Taslim S. Soetomenggolo, MD. Department of Child Health, Medical School, University of Indonesia, Jalan Salemba 6, Jakarta 10430; Phone (62) (21) 390-7742; Fax. 390-7743

mily history of epilepsy. Infants who had their first febrile convulsion before the age of 1 year have a 50% risk of recurrence, while the risk is only 28% for children who experience first seizure after the age of 1 year.<sup>5</sup> Studies have indicated that children who developed epilepsy after febrile seizures had a greater number of recurrences than children who did not develop epilepsy;<sup>6,7</sup> the rate of epilepsy was twice higher among children who had recurrences than those who did not.<sup>5</sup> The aim of this study was to determine the frequency of recurrences and the factors associated with the recurrences of febrile convulsions.

## Methods

Since January 1, 1990 until December 31, 1991 patients who experienced first febrile convulsion were followed at least for one year. The diagnosis of febrile convulsion was based on the history of illness and physical examination. Electroencephalographic (EEG) examination was performed to all patients. After the diagnosis of febrile convulsion was established, the patients were not given anti-convulsant but were advised to give rectal diazepam if they were suffering from recurrent convulsion.

The patients were asked to come to hospital every three months or when the patients suffered from recurrent convulsion for follow-up examination. Evaluation was performed for:

- the number of patients suffered from recurrent convulsion.
- the time of the occurrence of recurrent convulsion.
- association between age, type of con-

vulsion, frequency of convulsion, neurological disorders, result of EEG examination, history of febrile convulsion in family, history of epilepsy in family, and the occurrence of recurrence of febrile convulsions.

## Results

During two years, ninety two patients with the first febrile convulsion were followed in the Pediatric Neurology Clinic, Department Child Health, Cipto Mangunkusumo Hospital, Jakarta for at least one year. Of 92 patients, 58 (63%) were males and 34 (37%) females.

Table 1 shows the age distribution of the 92 patients. The number of patients aged less than one year was 27 (29.4%), the rest were 1 year or more. Most of the patients were 4 years of age or less, only 6 patients (6.5%) were older than 4 years. Of the 92 patients followed for at least for 1 year, only 8 (8.7%) patients suffered from recurrence of febrile convulsions (Table 2).

Table 1. Age distribution of the 92 patients

Age (year)	No	%
< 1	27	29.4
1 -	38	41.3
2 -	16	17.4
3 -	5	5.4
≥4	6	6.5
Total	92	100

Table 2. The number of patients with recurrence of febrile convulsions

Recurrence of febrile convulsion	n	%
Yes	8	8.7
No	84	91.3
Total	92	100.0

In five of the 8 patients the recurrence of febrile convulsions occurred during the first 6 months (Table 3), and in 3 patients the recurrence occurred during the next 6 months.

Table 3. The time of recurrence febrile convulsions

Time of recurrence	n	%
6 months	5	62.5
> 6 months	3	37.5
Total	8	100

Table 4 shows the relation between the age of the patients and the recurrence of febrile convulsions. Five (or 18.5%) of the 27 patients below one year of age suffered from recurrence of febrile convulsions, and only 3 (4.6%) of the 65 patients with the age of one year or more suffered from recurrences of febrile convulsions.

Of the 92 patients, 26 suffered from tonic seizures and 66 suffered from tonic-clonic seizures (Table 5). Three (11.5%) of the 26 patients with tonic

seizures suffered from recurrent febrile convulsions, while the 66 patients with tonic-clonic seizures only 5 (7.6%) suffered from recurrent febrile convulsions.

Table 4. Relation between the age of the patients and the recurrence of febrile convulsions

Age	Recurrences of febrile convulsions		Total
	Yes	No	
< 1 year	5 (18.5%)	22 (81.5%)	27
≥ 1 year	3 (4.6%)	62 (95.4%)	65
Total	8	84	92

Table 5. Relation between the type of convulsion and the recurrences of febrile convulsions

Type of convulsion	Recurrence of febrile convulsions		Total
	Yes	No	
Tonic seizure	3 (11.5%)	23 (88.5%)	26
Tonic-clonic seizure	5 (7.6%)	61 (92.4%)	66
Total	8	84	92

Fifty seven of the 92 patients suffered from single seizure, and 35 patients suffered from multiple seizures (Table 6). On follow-up, five (8.8%) of the 57 patients with single seizure suffered from recurrence of febrile convulsions, and in 35 patients with multiple seizures 3 (8.6%) suffered from recurrence of febrile convulsions.

Table 6. Relation between the frequency of seizures and the recurrence of febrile convulsions

Frequency of seizures	Recurrences of febrile convulsion		Total
	Yes	No	
Single seizure	5 (8.8%)	52 (91.2%)	57
Multiple seizures	3 (8.6%)	32 (91.4%)	35
Total	8	84	92

Table 7 shows the relation between the neurological disorders before convulsion and recurrences of febrile convulsions. Of the 92 patients, 15 patients suffered from neurological disorders, and 77 did not show any neurological deficit. Two of 15 patients with neurological disorders suffered from recurrent febrile convulsions, and only 6 (7.8%) of the 77 normal patients suffered from recurrent febrile convulsions.

The EEG examination showed normal patterns in 47 patients, and abnormal in 45 patients (Table 8). Of the 47 patients with normal EEG, 5 patients (10.6%) suffered from recurrent febrile convulsions, and in 45 patients with abnormal EEG, 3 patients (6.7%) suffered from recurrent febrile convulsion.

Table 9 shows the presence of febrile convulsion in family were 41 patients, and the absence were 51 patients. Four (9.8%) of 41 patients with febrile convulsion in family suffered from recurrent febrile convulsions, and in 51 patients with no febrile convulsion in family the recurrences of febrile convulsions occurred in 4 patients (7.8%).

Table 7. Relation between the neurological disorders and the recurrences of febrile convulsions

Neurological disorders	Recurrence of febrile convulsion		Total
	Yes	No	
Present	2 (13.3%)	13 (86.7%)	15
Absent	6 (7.8%)	71 (92.2%)	77
Total	8	84	92

Table 8. Relation between EEG and the recurrence of febrile convulsions

EEG	Recurrence of febrile convulsion		Total
	Yes	No	
Normal	5 (10.6%)	42 (89.4%)	47
Abnormal	3 (6.7%)	42 (93.4%)	45
Total	8	84	92

Five of the 92 patients had family history with epilepsy, while 87 of them did not have family history with epilepsy (Table 10). One (20%) of the 5 patients with epilepsy in their family suffered from recurrence of febrile convulsions, while of the 87 patients without epilepsy in their family only 7 (8%) suffered from recurrences of febrile convulsions.

## Discussion

In this study most of the patients had their first febrile convulsions by the age

Table 9. Relation of family history of febrile convulsions and the recurrence of febrile convulsions

Febrile convulsion in family	Recurrences of febrile convulsions		Total
	Yes	No	
Presence	4 (9.8%)	37 (90.2%)	41
Absence	4 (7.8%)	47 (92.2%)	51
Total	8	84	92

Table 10. The relation between the history epilepsy in family and the recurrence of febrile convulsions

Epilepsy in family	Recurrences of febrile convulsion		Total
	Yes	No	
Present	1 (20%)	4 (80%)	5
Absent	7 (8%)	80 (92%)	87
Total	8	84	92

of 4 years, and only 6.5% of them their first febrile convulsions occurred at the age of more than 4 years (Table 1). This finding is the same as the finding of Aicardi;<sup>9</sup> he found 85% of his patients had their first seizure by the age of 4 years.

The occurrence of recurrent febrile convulsions in this study was only 8.7%; this figure is too small, another studies reported approximately 30 to 37%.<sup>3,9</sup> Half of the recurrences take place within 6 months of the initial episode, and roughly three quarters of all recurren-

ces have occurred by one year.<sup>5</sup> In this study 62.5% of the recurrences also take place within 6 months (Table 3) of initial episode. The occurrence of recurrent febrile convulsions in this study is too small if be compared with other studies, it might be due to the sample of the patients were too small and too short the duration of the follow up.

From Table 4 can be seen infants who had their first febrile convulsions before the age of 1 year had a 18.5% risk of recurrence, whereas the risk was only 4.6% for children who first seizure after the age of 1 year. Other study reported 50% for infants before the age of 1 year, and 28% for children after the age of 1 year.<sup>5</sup> From these data can be concluded that infants before the age of 1 year have higher risk of recurrences than children after the age 1 year.

The risk of recurrences for patients with tonic seizures were 11.5%, whereas for patients with tonic-clonic were 7.5% (Table 5). This finding is not common, usually the risk of recurrence was more in patients with focal or prolonged seizures.<sup>8</sup>

The recurrences of febrile convulsions for patients with neurological disorders were 13.3%, whereas the recurrences were only 7.8% for patients without neurological disorders (Table 7). Shinnar et al<sup>11</sup> reported 88% of recurrences in patients with previous neurological abnormalities. It can be concluded that previous neurological abnormalities had a higher risk of recurrent febrile convulsions.

Patients with normal EEG had 10.6% risk of recurrences, whereas the risk was only 6.7% for patients with abnormal

EEG. From this data can not be concluded that abnormal EEG has predictive value for the risk of recurrent febrile convulsions. The EEG was of little if any practical value for the prediction of recurrences.<sup>8</sup>

Recurrences are probably more common in children with a family history of epilepsy.<sup>9</sup> In this study the recurrences of patients with family history of epilepsy were 20%, compared with those of only 8% for the patients without family history of epilepsy. These figures were not quite different with other reported studies.

In conclusion, the recurrence of febrile convulsions in this study were 8.7%. The risk of recurrences were the age of the first febrile convulsions before 1 year, the type of seizures were tonic seizures, the presence of previous neurological abnormalities and family history of epilepsy. Recurrence occurred mostly within the first 6 months. The EEG was of little if any practical value for the prediction of recurrences.

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