

Full Length Research Paper

## Febrile convulsion and emotional stress

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Acute symptomatic convulsions triggered by the fever without the presence of the central nervous system infections or any electrolyte imbalance in the children aged between six months and six years, not having previously known neurological anomalies are called febrile convulsion (FC). In this study, the effect of the emotional stress factor on the febrile convulsion was investigated. In the study, 150 patients, newly diagnosed in the outpatients' clinics of pediatrics at Aksaz Military Hospital and Ahu Hetman Hospital, were followed up and a questionnaire study was carried out with their parents to assess the emotional stress factor. Additionally, in a daycare center located in Marmaris town in Mugla province, 30 children aged between 2 - 5 years were chosen to establish a control group and all the children were observed from September 2006 to May 2009, to understand the effect of the emotional stress factor on FC. The needed consents were received from the authorities; and, it was warranted that the name of the daycare center would never be used in any way. The mean age of the children included in the study was 38 months. The rate of those having sleeping problems was 36%. The percentage of those attending a nursery or daycare center was 41.4%; those hospitalized before for any infection or disorder were in the percentage of 36%; the rate of the slowness of the psychomotor development denoted by the family was 36.7%. It was determined that 40% of the primary relatives of the children in the study had FC history and 36.7% of the children had FC history in the second-degree relatives. It was found that 60.7% (91) of the children had affection (high degree emotional dependency) for their mothers or fathers; that 36% (54) of the children had been away from their mothers or fathers for a long time for work or such reasons; and that 61.3% (92) of the children had a strong emotional nature by the description of their families. FCs occur by getting the genetic and environmental factors together. Among the environmental factors, there are subjective factors such as sleeplessness and emotional stress as well as the admitted factors e.g. age, fever, being preterm, hospitalization in the newborn period, attending a daycare center and tardiness in mental-motor development. FC events in the patients who had no environmental or genetic risk factors showed that the emotional stress was one of the prominent reasons and FC could occur after strong emotional traumas.

**Key words:** Febrile convulsion, emotional stress.

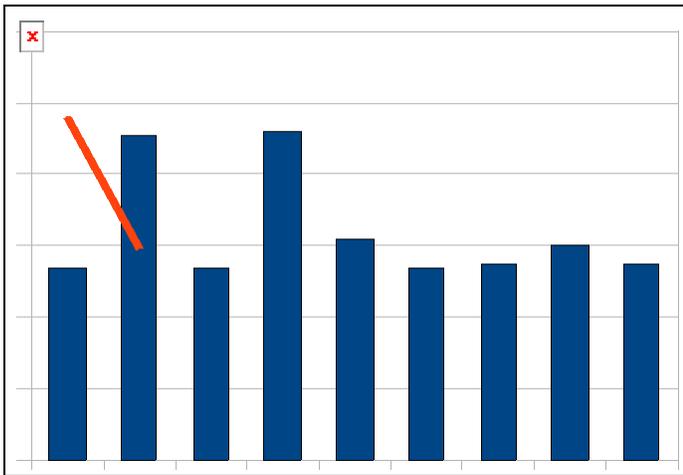
### INTRODUCTION

Convulsion is an abnormal discharge triggered in a focus in the central nervous system and exceeded the inhibitor mechanisms in the other neurons surrounding the focus and consequently leading to the motor or sensory symptoms in whole or a part of the body. The most frequent type of convulsion occurring in the children is the febrile convulsion; and, it is ranked in the higher places in terms of frequency among the neurological disorders in

the pediatric age. Acute symptomatic convulsions triggered by the fever without the presence of the central nervous system infections or any electrolyte imbalance in the children aged between six months and six years, not having previously known neurological anomalies are called febrile convulsion (Johnston, 2004; Hirtz and Nelson, 1998; Sadleir and Scheffer, 2007; Nelson and Ellenberg, 1976; Duffner and Baumann, 1999; Freeman and Vinig, 1992; BMJ, 1991; Carroll and Brookfield, 2002; Pediatrics, 1996; Epilepsia, 1993). Besides, the age range has been described as between 3 months and 5 years in the febrile convulsion description of the International League against Epilepsy (Hirtz, 1997;

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**Table 1.** The answers and the questions directed to the parents.



1, 2, 3, 4, 5, 6, 7, 8, 9, 10: Questions number

1. Indicate the age of the pediatric individual (your patient) in months.
2. Does the pediatric individual (your patient) have sleeping problems? Yes No
3. Does the pediatric individual have dependency on the mother or the father? Yes No
4. Does the mother or the father go to long-term travels for work or such reasons? Yes No
5. Is the pediatric individual (according to you) a strong emotional by nature? Yes No
6. Does the pediatric individual attend to a nursery or daycare center? Yes No
7. Did the pediatric individual hospitalize previously for any reason? Yes No
8. According to you, does your child have the psychomotor development slowness? Yes No
9. Do the primary relatives have a febrile convulsion history? Yes No
10. Do the second degree relatives have a febrile convulsion history? Yes No

Pfeiffer et al., 1999; Racacho et al., 2000; Racacho et al., 2000). All of the patients were followed up in the period between September 2006 and May 2009 in our study to understand the effect of the emotional stress on 150 children newly diagnosed with FC in the outpatients' clinics in Aksaz Military Hospital and Ahu Hetman Hospital. A questionnaire study was carried out with the parents of the children. Our study put emphasis on FC event in the patients who had no environmental or genetic risk factor; and it tried to determine whether the emotional stress was deterministic.

## MATERIALS AND METHOD

The patients newly diagnosed and under follow-up in the outpatients pediatrics clinics in the Aksaz Sea Hospital and Ahu Hetman Hospitals in Marmaris were chosen as the target patient population. The trial included 150 pediatric individuals.

All the patients were firstly recorded by years without considering any other classification. Our first group was consisted of 45 pediatric individuals referred to our hospitals in the period from September 2006 to September 2007 and diagnosed with FC; the second group was consisted of 40 pediatric individuals referred to our hospitals in the period between September 2007 and September 2008 and diagnosed with FC; our third group was consisted of 65 pediatric individuals referred to our hospitals in the period between September 2008 and May 2009 and diagnosed with FC. The patients were registered with the consents of their families; therefore, it was aimed to observe the recurrent FC and to explain the emotional stress factor.

FC is encountered in two types, simple and complex. The simple febrile convulsions are the seizures generalized, lasting for shorter than 10 - 15 min and no recurring within 24 h. The complex febrile convulsions, otherwise, are focal seizures lasting for more than 10 - 15 min with recurring within 24 h. The patients referred to our hospitals were classified as simple FC and complex FC by the type of FC and all of the groups were evaluated under these two classification. The criteria determined by the questionnaire were as

follows; not having had FC previously, no history of FC or epilepsy in the primary, second degree relatives, not born prematurely, duration of hospitalization not longer than 20 days, no tardiness of psychomotor development, mother or father away for a long time from the pediatric individual for work or such reasons (emotional stress factor), affection of the pediatric individual for mother or father, his/her extreme emotionality, dependency (emotional stress factor), definition of the pediatric individual as emotional by the family (emotional stress factor).

The questionnaire study is consisted of 10 questions. The first eight questions are about the environmental factors and the last two ones are related to the genetic factors (Table 1). The 3<sup>rd</sup>, 4<sup>th</sup> and 5<sup>th</sup> questions are about the emotional stress.

The data were assessed by SPSS for Windows 15.0 statistics pack software. Chi-square test was used for the comparison of the percentiles between the groups.  $P < 0.05$  was accepted to be statistically significant.

## FINDINGS

Of the pediatric individuals included in our study, 66% (99) was male, 34% (51) was female. In the review of the registration records of the pediatric individuals, it was determined that 6 patients had recurring FC within one year. Of the 30 pediatric individual in the control group, 70% (21) was male and 30% (9) was female. The points which more attention was paid were related to the emotional stress when the control group was established, its correlation with the genetic or environmental factors was considered and a distinct questionnaire study was made with the families of 120 pediatric individuals of the same age in the daycare center. In consequence of this study, 30 pediatric individual appropriate for the study were chosen from 120 pediatric individual.

The age of the pediatric individuals included in the study was the mean of 38 months. The rate of those had sleeping problems was 36%. The percentage of those attending a nursery or daycare center was 41.4%; the rate of those hospitalized previously for any infection or disorder were 36%; the rate of the slowness of the psychomotor development denoted by the family was 36.7%. The  $P$  values by Chi-square test for the second, sixth, seventh and eighth questions were 0.001, 0.034, 0.001 and 0.001, respectively. This was found to be significant, as  $P$  values were 0.05 (Table 2).

**Table 2.** Evaluation of the age factors.

|               | <b>Does the pediatric individual (your patient) have sleeping problems?</b> | <b>Does the pediatric individual attend to a nursery or daycare center?</b> | <b>Did the pediatric individual hospitalize previously for any reason?</b> | <b>Did the pediatric individual hospitalize previously for any reason?</b> |
|---------------|---|---|--|--|
| Chi-square(a) | 11.760  | 4.507   | 11.760   | 10.667   |
| df            | 1   | 1   | 1  | 1  |
| Asymp. sig.   | 0.001   | 0.034   | 0.001  | 0.001  |

**Table 3.** Evaluation of the genetic factors.

|               | <b>Do the primary relatives have a febrile convulsion history?</b> | <b>Do the second degree relatives have a febrile convulsion history?</b> |
|---------------|--|--|
| Chi-square(a) | 6.000  | 10.667   |
| df            | 1  | 1  |
| Asymp. sig.   | 0.014  | 0.001  |

**Table 4.** Evaluation of the emotional stress factors.

|               | <b>Does the pediatric individual have dependency on the mother or the father?</b> | <b>Does the mother or the father go to long-term travels for work or such reasons?</b> | <b>Is the pediatric individual (according to you) a strong emotional by nature?</b> |
|---------------|---|--|---|
| Chi-square(a) | 6.827   | 11.760   | 7.707   |
| df            | 1   | 1  | 1   |
| Asymp. sig.   | 0.009   | 0.001  | 0.006   |

### Evaluation of the genetic factors

The eighth, ninth and tenth questions are about the families, primary and second-degree relatives of the pediatric individuals and the genetic factors have an effect on FC. It was determined that 40% of the primary relatives of the pediatric individuals included in the study had FC history and 36.7% of them had FC history in the second-degree relatives. The P values by Chi-square test were found to be 0.014 and 0.001, respectively and it was found to be significant, as P values were < 0.005 (Table 3).

### Evaluation of the emotional stress factors

To understand the emotional stress, 3, 4 and 5 questions were asked in our questionnaire. It was determined that the pediatric individuals, 60.7% (86) had affection (high level emotional dependency) for the mother or the father; 36% (54) stayed away from his/her mother or father for a long time for work or such reasons; 61.3% (92) had a strong emotional character by their families expression. The emotional status of the pediatric individual, the parents (at least one) spending long periods of time away from the pediatric individual for work or such reasons and the strong affection of the pediatric individual for any of his/her parents, which were included in the emotional stress factors, were found to be significant by Chi-square test. P values were 0.009, 0.001 and 0.006, respectively (P < 0.005) (Table 4).

### DISCUSSION

Acute symptomatic convulsions triggered by the fever without the presence of the central nervous system infections or electrolyte imbalance in the children aged from six months to six years, not having previously known neurological anomalies are called febrile convulsion (Johnston, 2004; Hirtz and Nelson, 1998; Sadleir and Scheffer, 2007; Nelson and Ellenberg, 1976; Duffner and Baumann, 1999; Freeman and Vinig, 1992; BMJ, 1991; Carroll and Brookfield, 2002; Pediatrics, 1996; Epilepsia, 1993). Besides, the age range has been determined as between 3 months and 5 years in the febrile convulsion description of The International League against Epilepsy (Hirtz, 1997; Pfeiffer et al., 1999; Racacho et al., 2000; Racacho et al., 2000). The seizures are generally benign in character; it sustains its importance and actuality because the seizure may be recurrent and have the risk of turning into an epileptic seizure, although they are rarely encountered (Kjeldsen et al., 2002; Pediatrics, 1999; Stenklyft and Carmona, 1994). Febrile convulsions occur by getting the genetic and environmental factors together. Among the environmental factors, there are subjective factors such as sleeplessness and emotional

stress as well as the admitted factors e.g. age, fever, being preterm, hospitalization in the newborn period, attending a daycare center and tardiness in mental- motor development (Sadleir and Scheffer, 2007; Kjeldsen et al., 2002; Baulac et al., 2004; Scheffer and Berkovic, 2003).

Emotional stress mentioned among the environmental factors has a subjective character; though, we judged in our study that this subjective factor was needed to be in the common risk factors and to be assessed separately. In 50% of the children with FC, no risk factor was determined (Bethune et al., 1993; Camfield and Camfield, 1997). The reason of the occurrence of the febrile convulsions has not been clarified yet (Ayata, 2004). The emotional stress, literally, is that a person is under intense stress emotionally. The English etymology of the word 'emotion' denotes a movement from the body outwards. We react to the stimuli from the world outside or the instincts in our bodies with innate, species-specific certain reactions. They are previously regulated. The emotions are generally behavioral patterns programmed for survival. Its plateau is the body. When we say emotion, that to be understood is a change inside and the occurrence of a behavioral response against a stimulus or a thought. Between the species, there are emotional differences as well as the emotions accepted to be universal ([http:// www .ctf. Edu.Tr/stek /pdfs/47/4710.pdf](http://www.ctf.Edu.Tr/stek/pdfs/47/4710.pdf)). In the trials about FC, it was also observed that there were differences between the species. The prevalence of the febrile convulsions was determined to be from 2 to 8% up to the age of 7 years in the several previous studies (Johnston, 2004; Sadleir and Scheffer, 2007; Nelson and Ellenberg, 1976; Duffner and Baumann, 1999; Freeman and Vinig, 1992; Kjeldsen et al., 2002). This difference in the prevalence determined is due to the differences in the case definition, geographic and cultural factors. For example, the prevalence is ranged between 2 and 5% in the Caucasian children, while it rises up to 8 - 10% in Asian countries and Mongolian children (Johnston, 2004; Pediatrics, 1996; Srinivasan et al., 2005; Shinnar and Glauser, 2002; Offringa and Moyer, 2001; Hauser, 1994). Febrile convulsions are more frequently seen in boys than girls, it is slightly more frequent in African-Americans and in Mongolians. The socioeconomic status does not affect the frequency of febrile convulsions (Johnston, 2004; Hirtz and Nelson, 1998; Sadleir and Scheffer, 2007; Nelson and Ellenberg, 1976; BMJ, 1991; Pediatrics, 1996).

In consequence of the questionnaire study with the families of 150 pediatric individuals, it was determined that the emotional stress besides the environmental and genetic factors had effects on FC. Additionally, 4 of 30 pediatric individuals from our control group had FC although they had no risks. These febrile convulsions without genetic and environmental factors were considered as pediatric individuals' reactions following an intense emotional trauma (emotional stress). In our study, a strong emotional dependency on the mother or the father, the parents spending time away from their children for work or other reasons were considered as risk factors

for FC. It was determined that the emotional stress triggered the fever and that the children might have FC following the fever. The high temperature leads to an acceleration of excitatory impulses by reducing the calcium uptake into the cell and a decrease in inhibitor effect by reducing the GABA release into the synaptic space; when the seizure happens (Srinivasan et al., 2005; McIntyre et al., 1990). In conclusion, the emotional stress increases the risk of FC in pediatric individuals. Therefore, more attention should be paid. Moreover, we believe that such type of trials should include more people with longer periods of follow-up to better understand the effects of the emotional stress on FC.

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