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Early Prevention of Psycho-Speech Disorders during Febril Conversions in Children

Gaffarova Visola Furqatovna
Deportament of nevrology, Bukhara State Medical Institute named after Ali Abu ibn Sino, Uzbekistan

A B S T R A C T
The article presents the neuropsychological characteristics of children with febrile seizures. The results of neuropsychological examination of children with a history of febrile seizures showed a lag in intellectual and psycho-speech development in children with their transition to afebrile paroxysms.

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Relevance: Currently, it has been found that most children who have had FS have normal health, and the condition after the seizure has a benign course. Recently, evidence has emerged that a small number of children after FS may develop a neurological defect, recurrence of FS or epilepsy, learning problems, movement disorders and behavioral changes, non-specific sensory symptoms and memory disorders , which requires timely emergency care for children. with FS with timely correction of violations.

Purpose of the study: To characterize psycho-speech development, clinical, neurological, paraclinical features of febrile convulsions with optimization of the algorithm for managing this cohort of children, taking into account the early prevention of psycho-speech disorders.

Materials and research methods: To achieve this goal, 120 children with febrile seizures aged 6 months to 5 years were selected. The average age of children was 3.2±0.12. Among children with febrile convulsions, children of 2-3 years of age prevailed: 2-year-old children were 36.7%, 3-year-old 26.7%. A decrease in the number of patients with age was noted: children 4 years old accounted for 23.3%, and 5 years old - 10%. Among the examined children with febrile convulsions, there were more boys in the sex ratio - 63.3%, girls accounted for 36.7% of cases.

Criteria for inclusion in the study: fever, seizures, age from 6 months to 15 years.

Exclusion criteria: intracranial infection (encephalitis, meningitis), age over 5 years, absence of temperature.

The first stage of the study consisted of taking an anamnesis, clinical and neurological examination and testing for the establishment of delayed speech development (SRR) or psycho-speech development (PSRR).

For the completeness of registration, the author of this study developed a questionnaire. It included perinatal history data, hereditary factors (presence of febrile convulsions, epilepsy in relatives); conditions for the occurrence of seizures (temperature, degree of its rise, type of underlying disease,

frequency of diseases), information about the nature, frequency, duration of febrile seizures, neurological status data, data from additional research methods (EEG, EEG-video monitoring, MRI).

Diagnosis of convulsive conditions in children was carried out in accordance with the criteria recommended by the International Classification of Epilepsy and Epileptic Syndromes (1989).

Denver Developmental Screening Test (DDST). The test was developed by Frankenburg W. K., J. B. Dodds to identify children suffering from mental retardation from birth to 6 years of age. It contains 4 scales: 1) gross motor skills; 2) fine motor skills; 3) speech; 4) social adaptation. Of the 105 items, 75 are for children under 3 years of age. Usually a child is tested on 20 items. Each item is rated as "completed", "failed", "refusal to perform", "there was no opportunity to perform".

Testing is carried out both in conditions of direct observation and on the basis of information received from parents. Children who have completed all the points are considered to be developing normally. If there is one unfulfilled point in any scale, the result is considered doubtful, two unfulfilled points - developmental delay.

As a result of the survey, the children were divided into 2 groups: the main group consisted of 72 children (60%) with certain signs of DDD and DDD (main group), the comparison group consisted of 48 children with febrile convulsions without signs of DDD and DDD.

The data obtained were subjected to statistical processing on a Pentium-4 personal computer using programs developed in the EXCEL package using a library of statistical functions. Differences in mean values were considered significant at a significance level of $P<0.05$. Regression analysis was used to assess the influence of potential risk factors and construct a prediction equation, the quality of the 11 model was checked using ROC analysis, and the area under the curve (AUC) was interpreted. When making a decision on the equality of groups (in the absence of differences), $p = 0.05$ was determined as a threshold value. Differences were considered statistically significant at $p < 0.05$.

Results of the study: Analysis of the Denver scale data showed that in the group with febrile convulsions in 40% (48 out of 120) of patients, psychomotor development corresponded to age according to all 4 scales. In 43.3% of patients, there was a delay in speech development, in 30% of children there was a violation of individual social development, fine motor skills were impaired in half of the patients, and gross motor skills in 36,7%.

Temperature is one of the main conditions for the occurrence of febrile convulsions. We analyzed individual temperature characteristics associated with the onset of febrile seizures: the temperature level during the onset of seizures, the presence of temperature before the onset of seizures, the rate of temperature increase with the onset of seizures.

The temperature at which febrile convulsions occurred in children was more often higher than 38.5°C (56.7%), only 6.7% of children had body temperature less than 38°C. An attack of convulsions was the initial symptom of a febrile illness in 10% of patients, in 90% of cases the children were already sick and had a temperature. Convulsions occurred more often with a rapid increase in temperature (50%), and only in 3.3% of cases, the appearance of convulsions was noted with a sharp decrease in temperature.

Perinatal pathology is considered to be a marker of an increased likelihood of febrile seizures, which may have an impact on the clinical manifestation of febrile seizures and their outcome. When studying the perinatal history, the most significant pathology was taken into account: acute, chronic fetal hypoxia, a combination of chronic hypoxia and acute asphyxia in childbirth, premature birth, birth weight, and mechanical ventilation.

Pathology of pregnancy in children with febrile seizures was more common in the main group - 59.7% than in the comparison group, with a predominance of chronic fetal hypoxia in both groups.

Statistically significant differences were established in the course of labor, birth weight, and mechanical ventilation after birth between groups of children with febrile convulsions with and without impaired psycho-speech development.

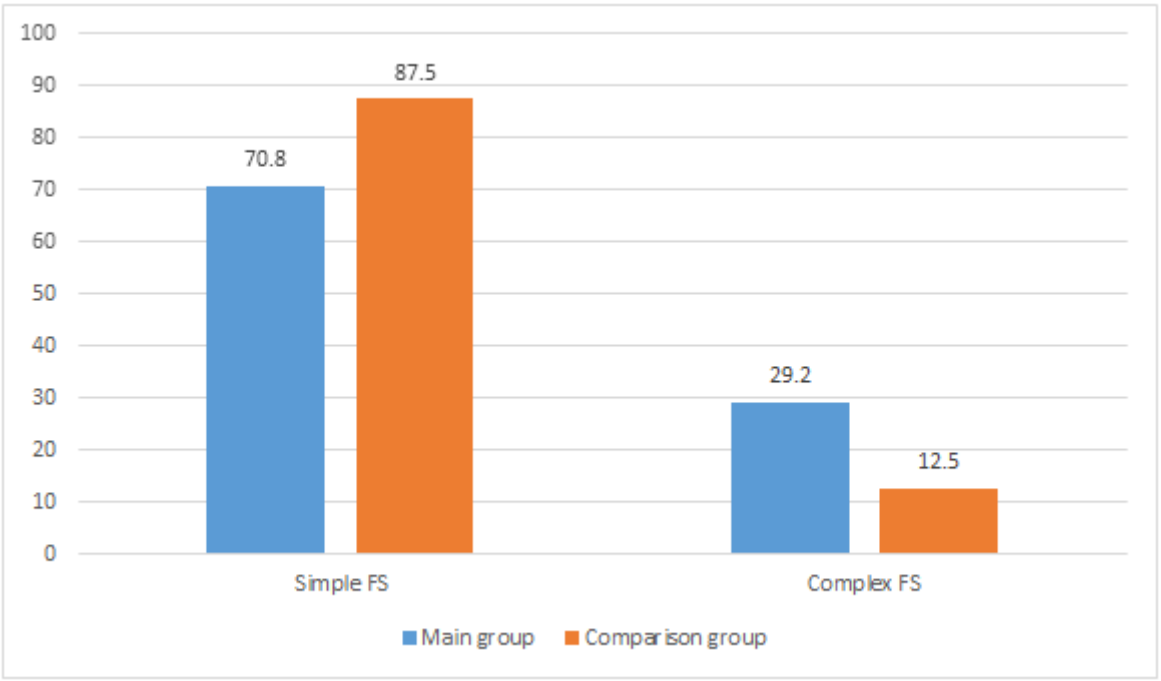
The temperature at which febrile seizures occur is most often caused by acute respiratory diseases, otitis media, pneumonia, intestinal infections, inflammation of the urinary tract. These infections are the cause

of most febrile disorders in childhood.

In our study, in the vast majority of cases, the underlying disease in children was an acute respiratory infection (86.7%). It is also known that fever as a result of immunization can also provoke febrile seizures. In our case, children who had seizures after immunization accounted for 10%.

It is noted that febrile convulsions were observed in frequently ill children. Thus, according to the study, 70% of children were considered frequently ill, since the frequency of respiratory infections in them was from 4-5 or more times a year.

The average duration of seizures was 4.03±2.18 minutes, simple AF was registered in 77.5% of cases (93 people), complex FS - 22.5% (27 people). Moreover, depending on the development of ZPRR in children with FS of the main group, simple seizures were recorded in 70.8% (51 children), and complex ones in 29.2% (21 children), while in the comparison group in 87.5% (42 children) and 12.5% (6 children), respectively, which was significant (P<0.05).



Frequency of occurrence of simple and complex FS in the examined groups

Most children (86.7%; 104/120) had generalized seizures. Of these, 63.3% (76/120) of children had generalized tonic-clonic seizures and 13.3% (16/120) clonic, in 10% (12/120) of patients the attack began with limp. Moreover, in children from the comparison group, clonic seizures were noted in 6.3% of cases (3/48), while in the main group in 18.1% (13/72), which is almost 2.9 times more often (P<0, 05).

Common to all seizures was a sudden and complete loss of consciousness. A generalized tonic-clonic seizure was characterized by a tonic spasm with the eyeballs moving upwards, followed by clonic twitches in the limbs, facial muscles, breath holding, cyanosis of the nasolabial triangle. After the attack, general weakness and drowsiness were noted.

In 13.3% of children, attacks proceeded in the form of clonic convulsions of the limbs and trunk with respiratory failure, in 10% of children at the beginning of the attack, limpness was noted with the eyeballs moving upwards, after which clonic twitches in the limbs and trunk, respiratory failure were added. Regardless of the nature of febrile convulsions, all children had post-seizure sleep.

We conducted an EEG study of the brain, which was usually carried out at least 10 days after the seizure. In children with febrile convulsions, the waking EEG in 76.7% was without pathology, in 23.3% EEG changes were recorded, which were mostly nonspecific: a slight slowdown in the background EEG activity (20.4%), as well as short diffuse discharges of theta- and delta waves with an amplitude of up to 100 μV in the background (3.3%). In the comparison group, pathological changes in the EEG were recorded in 12.5% (6/48), and in the main group in 30.6% (22/72).

In a neuroradiological study in patients with febrile convulsions, structural changes in the brain were detected only in 1 case (a cyst of the transparent septum).

The relative risk of developing ZPRR (RR) in children with FS with complex seizures is 3.6 (95% CI 1.6 - 8.4; p = 0.003), and with simple ones it is 0.5 (95% CI 0.3 - 0.8, p = 0.004)

The relative risk of developing ZPRR (RR) in children with FS with clonic seizures is 15.4 (95% CI 1.0 - 243.6; p = 0.05), and with generalized seizures it is 0.4 (95% CI 0, 3 - 0.6; p < 0.0001).

The relative risk of developing RDD (RR) in children with FS in the presence of focal neurological symptoms in the neurological status is 4.0 (95% CI 1.3 - 12.1; p = 0.01), and in the absence of deviations in the neurological status - 0.5 (95% CI 0.3–0.9; p = 0.009).

The relative risk of developing RDD (RR) in children with FS in the presence of pathological changes in the EEG is 1.6 (95% CI 1.0–2.4; p = 0.03).

The relative risk of developing RDD (RR) in children with FS in the presence of an unfavorable course of pregnancy and childbirth is 1.9 (95% CI 1.1 - 3.1; p = 0.01), and in the absence of a normal course - 0.6 (95% CI 0.4 - 0.8, p = 0.001).

Based on the identified statistically significant differences in the anamnesis, clinical manifestations, data from instrumental methods of research (electroencephalography) of children with FS, an equation for predicting the development of STDs was compiled by creating a mathematical formula using the regression analysis method, calculating the logit (p) logistic regression using the following formula:

logit (p) = -1.58 + (1.54xx1) + (1.06xx2) + (0.53xx3) + (0.87x4)

where:

x1 - complex FS (RR = 3.6; 95% CI 1.6 - 8.4; p = 0.003),

x2 - clonic seizures (RR = 15.4; 95% CI 1.0 - 243.6; p = 0.05),

x3 - disorders in the neurological status in the form of focal neurological symptoms (RR = 4.0; 95% CI 1.3 - 12.1; p = 0.01),

x4 - pathological changes on the electroencephalogram (RR = 1.6; 95% CI 1.0 - 2.4; p = 0.03).

The optimal value of the cut-off threshold for diagnosing the disease was determined: at $p > 0.74$, there is a high risk of developing STDs; at $p \leq 0.74$, there is a low risk of developing STDs.

The specificity of the proposed formula is 95.6%, and the sensitivity is 93.2%.

Management of children with febrile seizures.

Hospital stage - department of pediatrics (somatics, somatoneurology), infectious diseases department: determination of the nature of febrile convulsions, causes of fever, with typical convulsions - treatment of a somatic disease and relief of febrile convulsions and transfer to an outpatient level - observation by a trained neurologist, neuropsychological examination, EEG of the brain;

Formation of risk groups for the development of recurrent febrile convulsions and correction in the post-attack period: preparations of hopantenic, gamma-aminobutyric acid, calcium, magnesium, trace elements and vitamins, sanitation of foci of chronic infection, with atypical seizures, the ICU department, transfer to the neurology department, MRI or CT of the brain, EEG of the brain, neuropsychological examination of children with febrile seizures, if necessary, the appointment of antiepileptic drugs - valproic acid preparations (from 6 months to 2 years), depending on clinical manifestation of the disease, the frequency and duration of seizures and correction in the post-attack period: preparations of hopantenic, gamma-aminobutyric acid, calcium preparations, trace elements and vitamins, sanitation of foci of chronic infection. Prevention of the transformation of febrile convulsions into afebrile ones.

Correction of psycho-speech disorders:

1. Eliminate provoking factors - timely correct the somatic status, hyperthermia.

2. Prescribing drugs with minimal toxicity and side effects;

3. Using the principle of individuality when prescribing the drug (age, weight, tolerance, characteristics of the somatic status, etc.)

4. Monitoring the success of therapy (identifying and correcting side effects, monitoring the quality of life). Termination of therapy should be carried out gradually in order to prevent withdrawal symptoms, relapses of the disease.

1. Drug therapy

Cortexin (Polypeptides of the cerebral cortex of cattle) 0.01 g.m., No. 10, daily or every other day. ((Reliability grade B. Evidence level 2b) (Chutko L.S., Livinskaya A.M., 2006). Pantogam, pantocalcin (hopantenic acid) - 2 g per day, for 2 months. (Reliability grade C. Evidence level 4. (Kuzenkova L.M., Maslova O.I., 2007) Pantogam syrup (hopantenic acid, syrup 100 mg/ml) at an average daily dose of 500-600 mg (30-35 mg/kg) 2 times per day for 2 months in monotherapy (Grade of reliability B. Level of evidence 2b) (Guzeva V.I., Chutko L.S., 2016)

Logopedic correction:It can be carried out both in an individual and group format by a specialist speech therapist. One of the varieties of speech pathology is a system of motor exercises in which various movements are combined with the pronunciation of special speech material, with musical accompaniment. This is a form of active therapy to overcome speech and related disorders through the development and correction of non-verbal and speech mental functions, and ultimately the child's adaptation to the conditions of the external and internal environment. Logistics classes are aimed at the comprehensive development of the child, improving his speech, mastering motor skills, the ability to navigate the world around him, understanding the meaning of the proposed tasks, the ability to overcome difficulties, and express himself creatively. Logorhythm classes are an effective method of overcoming speech disorders through movement, breathing and music. They train auditory 26 perception, attention, memory, affect motor and speech disorders, behavioral deviations, and help with communication difficulties.

Based on the results obtained, an algorithm for managing children with febrile seizures was developed, taking into account the early prevention of psycho-speech disorders.

Conclusions: Using the algorithm for managing children with febrile seizures, taking into account the early prevention of psycho-speech disorders in all examined children, it was possible to adequately approach the choice of treatment methods. As a result, in 95.0% of cases, it was possible to reduce the development of psycho-speech disorders, improve the quality of life and prevent the transformation of febrile convulsions into afebrile ones.

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