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AFFECTIVE-RESPIRATORY PAROXYSMS IN CHILDREN: CLINICAL-NEUROLOGICAL ASPECTS.

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Abstract: Introduction. Affective-respiratory paroxysm (ARP) or breath-holding spells is a common phenomenon that occurs in children from 6 months to 6 years. Up to 90% of children experience ARP for the first time before the age of 18 months. The mechanism of the condition is still unclear. Scientists have found that children with breath-holding spells are much more likely to be diagnosed with iron-deficiency anemia and, perhaps, it contributes to the development of pathology. 20-35% of children have a burdened family history. Some families have a dominant type of inheritance.

Materials and Methods. The algorithm for examining children included: general clinical, neurological and psychological examination of children, conducting laboratory research, registration of an electroencephalogram, according to indications, conducting an echocardiographic study. We examined 50 children with ARP aged 6 months to 6 years. Research was carried out in the clinic of the Tashkent Pediatric Medical Institute. The diagnosis of ARP was established based on the history provided by mothers and observations of seizures. Paroxysms were defined as stopping the baby's breathing at exhalation after deep inhalation during crying. Paroxysms were classified as cyanotic, pale, and mixed.

Results. A detailed study of the passage of the ante-, intra- and postnatal periods made it possible to determine the significance of various unfavorable factors such as anemia ($p < 0.05$), toxicosis ($p < 0.01$), acute respiratory infections ($p < 0.1$), stress, use of obstetric aids ($p < 0.05$) and birth trauma. ($p < 0.1$). In addition to perinatal risk factors, 13 (28%) children were found to have a hereditary predisposition to ARP and 4 children (8%) to epilepsy. In most cases, seizures began at 6–12 months of age (38%). According to our observations, the main provoking factors of seizures were: anger, inability to get what you want - 70%, pain - 18%, fear - 12%. At clinical and neurological examination in children, ARP of neurotic nature (82%) prevailed over affectively provoked syncope (10%) and "epileptic" ARP (8%). The seizures in most cases were characterized by a typical course, medium duration and high frequency. When assessing psychoemotional and behavioral characteristics, children with ARP were more sensitive, intense, persistent, active, less distracted, and differed in mood variability compared to healthy children. According to the indicators of the functional state of the autonomic nervous system in children of the main group, the initial autonomic tone was characterized by sympathicotonia, normal autonomic reactivity was recorded significantly less than in the control group ($p < 0.05$). According to the results of laboratory studies, anemia (88%) and hypocalcemia (82%) were significantly more common in children with ARP. Analysis of electroencephalographic data revealed: signs of age norm - in 14 (28%) children, signs of dysfunction of nonspecific midline structures of the brain - in 6 (12%) children, general cerebral changes. - in 3 (6%)

children, signs that reduce the threshold of convulsive readiness - in 20 (40%) children, epileptiform activity - in 6 (12%) children.

Conclusion. The use of Pantogam in combination with basic therapy in children with moderate seizures was justified. Already after 3 months of therapy, the psychoemotional status of the majority of children improved, neurotic seizures decreased, seizures were stopped, and indicators of the bioelectric activity of the brain improved. Basic therapy with the inclusion of Konvuleks has also been shown to be effective in the treatment of children with severe seizures and epileptiform activity. The efficacy was less significant than in the other two groups, so epileptiform activity was still retained from short-term use. In general, positive dynamics was observed in all 3 groups, which was reflected in the reduction of seizures and improvement in the condition of children.

Keywords: affective-respiratory paroxysm, anemia, calcium, children, psycho-emotional

Introduction

Affective-respiratory paroxysms are a common problem in pediatric neurology and pediatrics, which is best understood as atypical responses to the threat. Threats activate the body to action, mediating an increase in arousal, respiratory and motor readiness. ATM are initiators of paroxysms [8]. To activate the disease, there must be some factors that cause resentment, anger, fear, or pain. Each child may have a special factor. As a result, there is a strong cry in which pulmonary hypocapnic ischemia and low blood pressure problems occur [5].

The terminology of this disorder has always been a problem. Since ancient times, ARP has been recognized as a form of hysteria. The description of Hippocrates (400 BC) and Atreus (200 BC) shows that this disorder is considered a psychogenic disorder [4]. Many years later, at the end of the 19th century, Charcot was the first to describe non-epileptic seizures as a clinical disorder, calling it "hysterical epilepsy" and "hysteria of the epileptic form" [2]. However, today it is known that ARPs are not only of psychogenic origin, but can also result from some physiological and organic disorders [1,2]. ARP have also been associated with iron deficiency anemia [10]. Iron deficiency anemia can lead to adverse effects on oxygen uptake in the lungs and reduced available oxygen for tissues, including tissues of the central nervous system [12,13].

The frequency of ARP in the pediatric population is 5-27% (Korovin A.M. et al., 1994; Rimet Y. et al., 1993). According to Linder, mild attacks with a change in skin color unconscious are observed in 4.7% of children, while severe, with loss of consciousness and seizures - in 1.7% [1]. The prevalence of ARP appears to be slightly higher, as population studies typically include patients with marked clinical symptoms. The risk of transformation of ARP into epilepsy is estimated differently - from 0.8% to 15% (Ratner A.Y. et al., 1983; Korovin A.M., 1984; Rafikova Z.B., 1987). According to V.T. Miridonov (1994), ARPs can form a clinic before the nosological period of epilepsy. Some authors suggest that epilepsy develops due to repeated episodes of brain hypoxia in frequent ARPs and in the presence of hereditary predisposition (Gusev E.I., Burd G.S., 1994; Hewertson J. et al., 1996). ARP can occur in children from 6 months to 6 years. They are most often found between the ages of 1 and 3 years. Some children have them every day, and some have them only once. On the basis of the data, early diagnosis of affective-respiratory paroxysms (ARP) and adequate therapy leads to rapid cessation of attacks, which allows preventing the development of epileptic seizures, syncopal conditions and neurotic disorders in children in the future.

The purpose of our research was to study the peculiarities of the clinical and neurological course of ARP with the development of an optimal version of management tactics.

Material and research methods. The object of the study was children suffering from ARP. A total of 50 children with ARP aged 6 months to 5 years were examined, and they formed the main group. The control group included 30 practically healthy children. The research was conducted in consultation clinics at the clinic of the Tashkent Pediatric Medical Institute. Age characteristics in the compared groups were comparable. The average age of children from the main group was 1.60±0.29 years, and from the control group 1.66±0.33 years, respectively. The results of the study revealed gender differences: in both study groups, the number of boys prevailed over the number of girls and amounted to the following: in the main group 32 (64%):18 (36%) (sex ratio 1.78:1) and in the control group 16 (53,3%):14 (46,7%) (sex ratio 1.14:1), respectively.

Analysis of individual development maps of each patient, archival materials, and a detailed survey of patients ' parents allowed us to study obstetric, hereditary, and family. A copy of the results of laboratory and instrumental studies was made. The duration of follow-up of children with ARP ranged from 1 month to 6 months. The General clinical examination was performed in a standard way: the state of the musculoskeletal, respiratory, cardiovascular, gastrointestinal and genitourinary systems was alternately evaluated to detect somatic pathology and comorbid background. To determine the correspondence of motor, mental, speech and mental skills to normal age indicators and to identify delays in psychomotor, mental and speech development, children were evaluated using the Gesell scale. According to this scale the child's psychomotor and speech development was assessed in five main areas: 1) adaptive behavior; 2) gross motor skills; 3) fine motor skills; 4) speech development; 5) socialization of the individual.

Neuropsychological diagnosis in young children is difficult due to age-related reasons, however, it is possible to work with parents, therefore, to assess the psycho-emotional status of children, we conducted a survey among parents using a special questionnaire developed by Malhotra. This questionnaire implies an assessment of 9 indicators of psycho-emotional status: activity, sensitivity, persistence, proximity, adaptability, mood, rhythm, intensity, distraction. This questionnaire consists of 45 questions, which are rated on a 5-point scale, depending on the severity of the above traits in the child.

All children under study underwent laboratory tests. For a general clinical blood test, blood was taken from children on an empty stomach, from the ring finger using disposable scarifies and sterile capillaries. Then, using a special analyzer, blood counts were calculated.

To determine the calcium content in blood serum in children, blood was taken from a vein on an empty stomach using disposable syringes in an amount of 2 ml. The analysis of the calcium content was carried out by the complexometric method immediately after taking the blood.

The study of the bioelectric activity of the brain of patients with epilepsy is a key diagnostic step. For EEG registration, 16-channel electrode systems were used (depending on the size of the head). Cup electrodes mounted in a plastic frame were used. Recording was performed using 12 monopolar leads with a reference united electrode on the earlobes according to the international scheme "10-20". The sweep speed was 30 mm / sec, the sensitivity of the EEG channels was 5 μV / mm. During the study, the patient was in a screened darkened office. To clarify the localization and severity of the pathological process

in the brain, functional exercise tests with photostimulation and hyperventilation were used for three minutes.

When analyzing the bioelectrical activity of the brain, we used qualitative indicators obtained during visual assessment and the subsequent unified description of patterns of bioelectric activity and their expert classification according to Zhirmunskaya E.A. by calculating frequencies, amplitudes, indices of alpha waves, slow waves, paroxysmal activity (Zabalotnykh V. A., Komantsev V.N., Povorinsky A.G., 1998; Gromov S.A., 2004). When identifying the spectral EEG pattern, we used a system of visual qualitative assessment, which helps to identify the relationship between the formation of brain bioelectrical activity and its morphological and functional characteristics at different stages of child development. (Zenkov L.R., 2002;). Analysis of the electroencephalogram included the following: the main characteristics of the background activity (severity, frequency, amplitude of the main rhythm, regularity, the shape of individual waves, zonal differences); subdominant rhythms, in the form of high-frequency oscillations, which are superimposed on the dominant activity; absence or presence of interhemispheric asymmetry and focal changes; the presence of transient components: epileptic patterns, paroxysms, outbreaks; reaction to functional tests (photostimulation, hyperventilation).

The degree of disturbances in the background bioelectric activity was assessed according to the classification of Zenkov L.R. (2004), G. Dumermuth (1976) and the International Classification of EEG Disorders (Luders, Noachtar, 2000 - Appendix 3), taking into account the age characteristics of the EEG in each age group (Blagosklonova N .K., Novikova L.A., 1994;).

Discussion of the results of the study. In the analysis of obstetric history, it was found that in 42.7% of cases, pregnancy occurred against the background of anemia ($p < 0.05$), toxicosis ($p < 0.01$), ARI ($p < 0.1$), stress ($p < 0.1$), the use of obstetric benefits ($p < 0.05$) the threat of termination of pregnancy ($p < 0.1$), gestosis of the second half of pregnancy ($p < 0.1$), previous medical abortion ($p < 0.1$) Among the factors that aggravated the birth act, the most common were rapid births ($p < 0.05$), traumatic births ($p < 0.1$) and births with fetal asphyxia ($p < 0.1$).

We revealed that children with a cyanotic form of ARP had significantly lower levels of hemoglobin, serum iron, a lower percentage of transferrin saturation than children in the control group.

According to the results of the analysis of serum calcium in the main group, only 8 children recorded normal indicators, 32 children showed hypocalcemia.

The age of appearance of the first attacks of ARP in children was on average 3.5 ± 1.1 years. The results of the nature of the attacks were recorded as follows: in 68% of cases there were neurotic attacks, in 20% - neurolike, 4% syncopal and in 8% of children "epileptic" attacks. Changes in the color of the skin of children during attacks in 24 (60%) children acquired a cyanotic tint, in 9 (22.5%) a pale tint and in 7 (17.5%) a cyanotic tint and at times a pale tint.

When assessing neurological status in children with ARP compared to the control group, the following syndromes were more often recorded: muscle tone disorder ($p < 0.1$), nerve reflex excitability syndrome ($p < 0.05$), intracranial hypertension syndrome ($p < 0.1$), cerebrastenic syndrome ($p < 0.1$), attention deficit hyperactivity disorder ($p < 0.05$), vegeto syndrome

Analysis of psycho-emotional behaviors according to the methodology of G.P. Lavrentieva, T.M. Titarenko showed that the level of anxiety in children with ARP was significantly higher than in children from the control group. Children with ARP turned out to be more anxious, sensitive, emotionally labile and less rhythmic, distracted compared to healthy children ($p < 0.1$).

Electroencephalography is one of the main methods of objective testing of the functions of the nervous system. Being an almost ideal method of direct mapping of CNS functioning, EEG solves issues of diagnostics of not only organic but also functional brain lesions [14].

According to the results of EEG studies, in 15 (37.5%) children with ARP the age norm was recorded, in 4 children (10%) - signs of dysfunction of nonspecific median brain structures, in 3 (7.5%) children - cerebral changes. Finally, epileptiform activity was detected in 6 (15%) children with ARP.

It is not known how iron and calcium deficiency leads to ARP. This may include the role of iron in the metabolism of catecholamines and the functioning of enzymes and neurotransmitters in the central nervous system [10].

Correction of paroxysms during iron treatment may be associated with functional repair of these neurotransmitters. Therefore, therapy of affective-respiratory paroxysms should be differentiated. The main objective of ARP therapy is aimed at arresting seizures and preventing the transformation of seizures into epilepsy. When choosing therapy for patients with ARP, one should rely on the following data: characteristics of attacks (type, course, frequency, duration), state of neurological status, severity of psychoemotional and behavioral symptoms, hematological parameters (hemoglobin, erythrocyte, serum calcium concentration), character EEG patterns, the presence of comorbid pathological conditions.

Taking into account the above, the examined children were divided into 3 groups: group 1 included 19 children with mild ARP with moderately expressed psychoemotional symptoms, normal and conditionally normal variants of EEG signs; group 2 included 25 children with an average degree of ARP with severe psychoemotional symptoms and nonspecific EEG signs; group 3 included 6 children with severe ARP, with pronounced psychoemotional symptoms and having epileptiform activity on the EEG.

For children of group 1, basic therapy was used as a treatment; it included the following: for the purpose of correcting iron deficiency anemia - iron preparations; for the purpose of replenishing the calcium deficiency in the blood serum - calcium preparations, restorative therapy. Medical methods of treatment were supplemented by psychological correction, rational nutrition, hardening procedures. All drugs were prescribed at an age-specific dosage for 3 months. Group 2 children received basic therapy in combination with Pantogam syrup. Children of group 3 were recommended basic therapy with the inclusion of an antiepileptic drug - Konvulex drops. In the treatment of convulsive conditions in young children, not only the efficacy and safety of the drug is important, but also an easy-to-use form of release. Considering that the use of solid dosage forms in young children is problematic, Konvulex in the form of drops is an excellent alternative. Konvulex was prescribed as monotherapy at an initial dose of 10 mg / kg per day in 2 doses. The maximum daily dose was 20 mg / kg per day.

Follow-up observation was 3 months. During the period of therapy, all the children under study underwent dynamic observation of a neuropathologist and pediatrician, as well as clinical blood tests (general blood count, determination of ALT, ASAT), ultrasound

examination of the liver and gallbladder (children from group 2) and registration of electroencephalography.

After 3 months of therapy, we assessed blood parameters, serum calcium, severity of psychoemotional manifestations, frequency characteristics of seizures, and indicators of brain bioelectrical activity.

After 3 months of therapy, we revealed the following results: in group 1 before treatment, 5 children had normal hemoglobin and erythrocyte counts, 4 had 1-degree anemia, 8 had 2-degree anemia, 2 had 3-degree anemia and after of treatment, normal indicators were found in 8 children, in 7 anemia of the 1st degree, in 8 anemia of the 2nd degree. In group 2, before treatment, 1 child had normal values, 4 had grade 1 anemia, 15 had grade 2 anemia, and 5 had grade 3 anemia. After 3 months of treatment, 5 children were found to have normal values, 9 had 1-degree anemia, 10 had 2-degree anemia and 1 had 3-degree anemia. In group 3, before treatment, not a single child had normal values, 1 had grade 1 anemia, 4 had 2-grade anemia, 1 had 3-grade anemia, and after treatment 1 had normal values, 3 had 1-grade anemia. degree, 2 anemia of 2 degree.

In children of group 1, after the therapy, all indicators of psychoemotional status changed in a positive direction, in contrast to the initial indicators. In children from group 2, after therapy, the severity of psychoemotional symptoms became less pronounced. The children of the 3rd group also showed an improvement in the psychoemotional status of children, but the dynamics was lower in relation to the other two groups.

After the therapy, it also favorably influenced the frequency of attacks. If before treatment in group 1, 12 children had up to 5 seizures, in 7 5-10 seizures per week, then after therapy in 9 there were up to 5 seizures, in 3 5-10 seizures a week and in 7 children the seizures were completely stopped. In group 2, before treatment, up to 5 seizures were observed in 9 children, in 14 5-10 seizures, in 2 more than 10 seizures per week, then after therapy in 5 children up to 5 seizures were observed, in 7 5-10 seizures and in 13 children seizures were completely leveled. In group 3, before treatment, 1 child had up to 5 seizures, 3 5-10 seizures, 2 more than 10 seizures per week, then after therapy, 3 children had up to 5 seizures, 2 5-10 seizures per week and neither in one case, complete relief of seizures was not observed.

The positive effect of the therapy on the indicators of the bioelectric activity of the brain was also noted. So, in group 1 before treatment, 15 children had a normal EEG variant, only 4 children showed dysfunction of nonspecific midline structures of the brain, then after therapy, 18 children showed normal parameters and only 1 child still had nonspecific dysfunction. median structures of the brain. In group 2, initially, 2 children had dysfunction of nonspecific midline structures of the brain, 3 children had general cerebral changes, 20 had a decrease in the seizure threshold, the indices were 0.0.1 and 9, respectively. Finally, in group 3, before treatment, 6 children had epileptiform activity, after 3 months of therapy, epileptiform activity was still preserved.

Conclusion. Affective-respiratory paroxysm is associated with anemia (88%), hypocalcemia (82%) and heterogeneous changes in the bioelectrical activity of the brain: signs of an age norm (30%), dysfunction of nonspecific midline structures of the brain (12%), general cerebral changes (6%), lowering the threshold of convulsive readiness (40%), epileptiform activity (12%).

ARP therapy should be differentiated. For children with mild seizures with moderately severe neurotic manifestations and without pathological EEG signs, it is sufficient to

prescribe only basic therapy; children with moderate seizures, with severe neurotic symptoms and nonspecific EEG signs, it is necessary to include Pantogam in the complex of therapy; children with severe seizures with pronounced neurotic manifestations and having epileptiform activity on the EEG are advised to prescribe antiepileptic therapy (Konvuleks drops).

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