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ETHNIC FEATURES OF FETAL ALCOHOL SYNDROME MANIFESTATION

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Summary: An incidence of fetal alcohol syndrome (FAS) in maternity, child hospitals and orphanages of St. Petersburg and Republic of Sakha (Yakutia) (RS (Ya)) was investigated. 39 children with FAS from St. Petersburg and 39 ones from Republic of Sakha (Yakutia) were evaluated in detail by means of the standard neurological assessment, Developmental Scales, anthropometry, 4-Digit Diagnostic Code and MRI and Cranial Ultrasound. Even and Sakha children demonstrated significant decrease of palpebral fissure length compared with the europoid babies up to the age of 3 years old. Sakha children had most often ptosis, epicanthus and dilatation of subarachnoidal spaces than St. Petersburg babies regardless of ethnic features. No significant difference between babies' subgroups in physical and neurodevelopment was detected.

Key words: fetal alcohol syndrome, ethnic features.

Introduction. Toxic encephalopathies of neonates take one of the main places among children neurological disturbances.

In the first place – fetal alcohol syndrome (FAS). Its importance is defined by wide alcohol consumption among population, in particular women (including pregnant), severe consequences of alcohol exposure for fetus and baby, and also by the fact that FAS is perhaps the only avertable cause of mental retardation in children [6, 7].

The prevalence of FAS has distinct ethnic and social regularities. It is generally agreed that FAS prevalence rate is estimated to be between 0.2–2.0 in every 1000 live births. In families of low economic level FAS prevalence is about 3.0–5.0 per 1000 live births. Less expressed fetal alcohol effects are found in 1 case per 300 live births. In North America FAS problems are studied closely: in American Indians families the FAS rate is 8.5 per 1000 live births, in Canadian Indians families fetal alcohol spectrum disorders (FASD) – up to 190 in every 1000 live births. If there is one baby with FAS in a family the incidence rate of FAS in all younger children in this family is 771:1000 [8, 15]. According to CDC criteria [11] FAS diagnosis requires:

1. Documentation of all three FAS facial features present (smooth philtrum, thin vermilion and small palpebral fissures);

2. Documentation of growth and weight deficits;

3. Documentation of central nervous system abnormalities;

4. Documentation of prenatal alcohol exposure.

As the first three parameters' definition depends on regional and ethnic features, there is a question of ethnic specificity of FAS manifestation.

The aim of this investigation is to study ethnic and regional features of FAS in St. Petersburg and Republic of Sakha (Yakutia).

Materials and methods. In St. Petersburg (SPb) maternity clinic, specialized neonatological center, psychoneurological orphanage and correction orphanage for children with development disturbances 39 europoid babies with FAS aged up to 7 years old were observed. Also FAS was studied in Allaykhovsk, Oymyakon, Aldan, Verkhnevilyusk regions, and in Evenki settlement Iengra, RS (Ya), where 39 children with FAS were found (18 natives, 21 europoids).

FAS is diagnosed with criteria of 4-Digit Diagnostic Code (University of Washington): confirmed growth and weight deficiency, facial dysmorphia (smooth philtrum, thin vermilion and small palpebral fissures), central nervous system damage, prenatal alcohol exposure. On the basis of the above-mentioned they assessed facial features, anthropometric data, neurological status, other specialists conclusions and additional investigations results [9].

Nervous system of neonates was estimated with L.M.S. Dubowitz Scale [10] and Depression-irritation profile [5]. Neurodevelopment dynamics was estimated with L.T. Zhurba Scale [2], Denver test, and also Motor Quotient (MQ) [3] and Developmental Quotient (DQ) [4, 13, 14].

Childrens' physical development was estimated with guideline “Assessment of the main anthropometric features and several physiological parameters of the children living in North-West” [3]. The physical development of neonates was estimated with “Neonates physical development assessment: methodological recommendations” (ed. by G.M. Dementieva) [1].

Structural characteristics of disease were defined with cranial ultrasonography and brain MRI.

The results were processed with nonparametric analysis methods (χ^2-criterion, Spearman correlation) and the standard programme Statistica for Windows 8.0.

Results. The analysis of FAS diagnosis in SPb social and health-care institutions is presented in Table 1. In the studied RS (Ya) orphanages 26 children with FAS were found, it is 13%. The examination of different FAS manifestations in SPb and RS (Ya) children is made with consideration of childrens' ethnicity.

Palpebral fissures length distribution according to childrens' age, region and ethnicity is presented in Table 2.

The analysis of the data in this Table shows that up to 3 years old palpebral fissures length is less in Even and Sakha children than in europoids both in RS (Ya), and in SPb ($\chi^2 = 7.14$; $p = 0.0076$). After the age of 3 years old these differences come to nought. No difference between europoid children, regardless of region, was detected.

Examination of other facial features is presented in Table 3.

As you can see from this Table, low nasal bridge, low forehead and ear auricle anomaly were found in children with FAS without significant difference regardless of region and ethnicity. Low nasal bridge in RS (Ya) children was detected more frequently regardless of ethnicity ($\chi^2 = 20.35–26.41$; $p < 0.0001$), as well as epicanthus ($\chi^2 = 17.12–30.54$; $p < 0.0001$). Other disembriogenetic stigmas’ and developmental defects’ analysis did not show any significant differences or regularities (Table 4).

Anthropometric data of the observed children (Table 5) is also homogeneous, it indicates equal developmental delay in all subgroups.

Cerebral structural changes diagnosis in children with FAS (Table 6) detected more frequent visualization of subarachnoidal spaces dilatation in RS (Ya) children and residual changes in St. Petersburg babies.

Assessment of neurological status and developmental milestones (Table 7) showed more frequent incidence of ptosis in RS (Ya) children ($\chi^2 = 7.22$; $p = 0.0072$).

Thus, having examined FAS prevalence and manifestation in St. Petersburg and RS (Ya) children, we may come to the following **conclusions:** FAS diagnosing varies in different medical institutions, in maternity clinic it is estimated between 0.79–3.6%, in specialized institutions – up to 46.4%. FAS is manifested by growth and developmental delays, facial dysmorphia and other signs of dysembryogenesis, motor delay and mental retardation; all these features were detected almost in all observed children. Cerebral structural changes were found by means of neurovisualization only in a small part of the observed children, in the neurological picture muscle tone changes prevailed. Comparison of FAS clinical manifestation in St. Petersburg and RS (Ya) children showed that Even and Sakha children up to 3 years old had less palpebral fissures than children-europoids, regardless of the region; RS (Ya) children more frequently had ptosis, epicanthus and dilatation of subarachnoidal spaces, but less frequently residual changes at neurovisualization. No significant difference between babies' subgroups in physical and neurodevelopment was detected.

Discussion. The present work studies current interdisciplinary problem: consequences of prenatal alcohol exposure. FAS has distinct ethnic and regional characteristics.

There are certain ethnic and geographical isolates with high incidence of FAS and FASD, it is determined by alcohol consumption mode in these ethnic groups during pregnancy, and also by genetic traits of alcohol metabolism.

In the present pilot study data concerning FAS diagnosing in St. Petersburg social and health-care institutions is presented, though we did not get this information in RS (Ya). On the other hand, because of ethnic heterogeneity in RS (Ya), there is a problem of verification of facial dysmorphia, anthropometric parameters, and rate of neurodevelopment.

The current work shows that the main diagnosis element – palpebral fissures length – is less in Even and Sakha children compared to europoids from RS (Ya) and SPb only under 3 years old. We can hardly explain the obtained data about more frequent occurrence of ptosis and epicanthus in children from RS (Ya), including europoids, compared to SPb europoids. Also we do not have an explanation of significant differences of neurovisualization data from two regions.

Thus, taking into account this preliminary investigation results we can note that to improve FAS diagnosis we should standardize childrens' physical and neurodevelopment parameters with consideration of regional and ethnic features, and specification of interpretive parameters of neurovisualization methods.

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Table 1

Dynamics of FAS diagnosis in St. Petersburg children's institutions

Institution	Year of registration									
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Maternity clinic, %				2.7	1.17	3.62	2.25	2.38	2.4	0.79
Neonatological center, %						3.5	1.2	1.0	0.6	0.3
Specialized orphanage, %	9.3	8.7	9.0	7.0	7.3	6.7	6.5	8.9	4.6	6.2
Correction orphanage, %							46.4	44.6	42.7	

Table 2

Palpebral fissure length of children with FAS (n = 78)

Age	Ethnicity and region			
Palpebral fissure length	Even	Sakha	Europoid (RS (Ya))	Europoid (SPb)
Neonate				
13 mm				1
15 mm				4
16 mm				1
1–6 months				
15 mm	1			1
16 mm		1		1
18 mm			1	1
7–11 months				
16 mm				1
18 mm			1	
1 year				
12 mm	1			
15 mm		1		1
16 mm		1		
17 mm		1		1
18 mm	1		1	3
19 mm				1
20 mm				2
2 years				
15 mm	1	1		

16 mm				1
17 mm			1	1
18 mm		1	1	2
19 mm			2	1
20 mm			2	3
3 years				
16 mm				1
17 mm				1
19 mm			1	1
20 mm				3
4 years				
18 mm	1		1	
20 mm		2	2	1
21 mm				1
5 years				
17 mm		1		
18 mm				
19 mm			2	
20 mm			1	
21 mm				
22 mm			1	
6 years				
17 mm		1		
18 mm				
20 mm	1			
21 mm				
22 mm				
7 years				
19 mm		1		
20 mm		1		

Table 3

Facial dysmorphia in the observed children

Facial feature	SPb (n = 39)	RS (Ya)		
		Even (n = 6)	Sakha (n = 12)	Europoids (n = 21)
Low nasal bridge	3 (7.7%)	5 (83.3%)	9 (75%)	15 (71.4%)
Epicanthus	1 (2.5%)	4 (66.6%)	9 (75%)	10 (47.6%)
Low forehead	3 (7%)	2 (33.3%)	4 (33.3%)	4 (19%)
Ear auricle anomaly	7 (17.9%)	1 (16.6%)	3 (25%)	7 (33.3%)

Table 4

Disembriogenetic stigmas and developmental defects *

Stigmas and defects	SPb (n = 39)	RS (Ya) (n = 39)
Optic nerve hypoplasia	4	4

Conductive hearing loss	2	3
Uranostaphyloschisis	1	2
Chest distortion	1	5
Hip joint dislocation	2	1
Hemangiomas	2	4
Congenital heart defects	19 (48.7%)	15 (40.5%)

Table 5

Anthropometric measurements of children with FAS (n = 76)

	Height			Body weight			Head circumference		
Centiles	3	10	25	3	10	25	3	10	25
Mongoloids (RS) (n = 17)	14	3		14	2	1	15	2	
Europoids (RS) (n = 20)	18	2		18		2	16	4	
Europoids (SPb) (n = 39)	34	4	1	33	5	1	27	8	4
Total	66	9	1	65	7	4	58	14	4

Table 6

Cerebral structural changes according to neurovisualization data *

Structural changes	SPb (n = 25)	RS (Ya) (n = 22)
Agenesis and hypogenesis of the corpus callosum	1	2
Cerebellar vermis hypoplasia	1	0
Pachygyria	0	1
Cysts (of central fissure and pellucid septum)	3	4
Dilatation of subarachnoidal spaces	0	6
Inhomogenous parenchyma	2	2
Residual changes	8	0
NAD	4	4

Table 7

Neurological disturbances and features of neurodevelopment in children with FAS *

Feature		SPb	RS (Ya)
Ptosis		4 (10.2%)	14 (35.8%)
Strabismus		8 (20.5%)	10 (25.6%)
Muscle tone change		22 (56.4%)	26 (66.6%)
Speech delay		19 (90%)	26 (92.9%)
Fine motor skills delay		13 (61.9%)	23 (82.2%)
Motor delays and mental retardation (L.T. Zhurba et al. Scale)	Risk group	5 (50%)	3 (33.3%)
	Development delay	5 (50%)	6 (66.6%)

*Because of occasional occurrence the ethnicity is not detected.

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The analysis of frequency of myocardium infarction at native and non-native population of Yakutsk city (based on a hospital register of the cardiologic unit MI «Yakutsk clinical hospital»)

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We carried out the retrospective survey of 5061 history cases of inpatients of the cardiological unit MI «Yakutsk clinical hospital» during 2006-2009. Of them 723 cases had myocardium infarction with Q on the electrocardiogram. The data obtained testify to available distinctions of myocardium infarction with Q on the electrocardiogram at the natives and non-natives. The prevalence of Q positive myocardium infarction was higher at men as compared with women in both ethnic groups for all period of the survey. During 2006 – 2009 the increase of myocardium infarction was marked both at men and women in both ethnic groups. The frequency of myocardium infarction at the native population was lower in comparison with the non-natives. During the last years the rejuvenation of myocardium infarction has been noted at the natives of Yakutsk.

Key words: myocardium infarction, ethnic features, Yakutia.