

UDK 616-053.2:614.1:613.81-055.26

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## ALGORITHM FOR MONITORING OF YOUNG CHILDREN BORN FROM MOTHERS WITH ALCOHOL USE

The data of 85 young children were processed. Perinatal and anthropometric sings, electroencephalographic patterns and developmental assessment by KID-RCDI-2000 were performed. It is shown, that more severe delay of development was in children with alcohol related birth defects. The cognitive, motor, speech and language, socio-emotional and adaptive domains were undevelopmental even in fetal and partial fetal alcohol syndromes. The abnormalities of EEG are inherent. The data obtained from the monitoring of children of early age with prenatal alcohol exposure, allowed to create the algorithm of medical care. The use of algorithm of monitoring young children with prenatal alcohol exposure will improve medical and social care of young children with prenatal alcohol exposure in low and middle income country as Ukraine.

**Keywords:** *young children, fetal alcohol spectrum disorders.*

### Introduction

Prenatal exposure to alcohol is a leading preventable cause of birth defects and developmental disabilities. Fetal alcohol spectrum disorder (FASD) is a term that is used to describe the range of effects that can occur in an individual who was prenatally exposed to alcohol and may have lifelong implications and high societal costs [1]. FASD is an umbrella term that encompasses the range of physical, mental, behavioral, and cognitive effects that can occur in individuals with prenatal alcohol exposure [2, 3]. In most diagnostic schema, FASD is not a diagnostic term but describes a group of specific conditions, including: fetal alcohol syndrome (FAS), partial fetal alcohol syndrome (pFAS), alcohol-related neurodevelopmental disorder (ARND), neurobehavioral disorder associated with prenatal alcohol exposure (ND-PAE), alcohol-related birth defects (ARBD) [4, 5].

The major roles of the pediatric primary care provider in caring for children with FASD include early identification and provision of education and anticipatory guidance, family support [6, 7]. Unfortunately, in Ukraine, there are no normative documents regulating medical surveillance and treatment of children with

FASD. Moreover, the scale of development of young children is not used in Ukraine. **The purpose of research** is to create algorithm of medical care of young children with prenatal alcohol exposure.

### Material and methods

The 85 young children aged till 4 years were included. All of them have been to Kharkiv Regional Specialized Baby Home № 1 during 2011–2017 years. Depending on the morphological manifestations of prenatal alcohol exposure, the children are divided into groups: group I – 24 children with ARBD; group II – 28 children with FAS; group III – 33 children with pFAS. The anamnesis, clinical signs and early childhood period were investigated. Analysis of the main domains (cognitive, motor, speech and language, social-emotional, adaptive) measured on a scale KID-RCDI-2000, developed by H. Ayrton (USA) in the Russian version [8]. Questionnaire determined the behavior of children by 216 % in the following areas: social (40 %); self (40 %); gross motor skills (30 %); fine motor skills (30 %); expressive language (41 %); impressive language (40 %). Within each domain order of questions was accidental. The level of development was determined by the recommended

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technique points «age normal score», «age limit slight delay», «age limit delay», are presented in tables and on the linear scale of development by which each domain defined line of the child's age, category «normal development», «slight delay», «delay». To assess the functional status of brain on EEG (DXKC.941319. 001-02P electroencephalogram, Ukraine, 2012) by the standard method. Power and coherence spectra are estimated in the range of delta (0.5–3.0 Hz), theta (4–8 Hz), alpha (8–13 Hz) and beta (13–30 Hz) rhythms. The time constant was 0.3 sec, write speed standard – 30 mm/sec [9]. For anthropometric investigation the growth charts were applied. Used a corrected age in young children born premature [10].

For statistical analysis statistical packages software of the «Excel for Windows», «Statistica 7.0. for Windows» were used.

### Results

The children came to the medical institution with documents, which indicated the use of alcohol by their mothers. Distribution of gestational age at birth was over the full 37 weeks – 38 (44.7 %); 34–37 weeks – 24 (28.2 %); from 32 to less than 34 weeks – 10 (11.7 %); from 28 to less than 32 weeks – 9 (10.5 %); from 22 to less than 28 weeks – 4 (4.7 %) children. At birth, the most frequent delay in intrauterine development occurred in body weight. It should be noted that the lowest incidence of intrauterine weight and body length was observed in children with pFAS (24.2 %) compare in children with ARBD (66.6 %) and FAS (71.4 %),  $p_{I,II}=0.0028$ ,  $p_{II,III}=0.0046$  in accordance.

Children with ARBD have following defects: central nervous system – 13 (microcephaly, parenchymal cysts, Arnold–Chiari malformation, corpus callosum agenesis, hydrocephalus); skeleton – 29 (dysplasia of the hip joints, deformation of foot, cleft of the upper lip and palate, kyphoscoliosis, polydactyly); cardiovascular system – 23 (ASD, VSD, PDA, valve atresia, false chord of the left ventricle); urogenital system – 11 (hypostasty / epispady, pyelactasia, congenital fistula of the bladder, hydronephrosis, kidney dysplasia and dystopia); hearing and visual problems – 20 (ezotropia, atrophy of the optic nerves, microphthalmic, bilateral ptosis, bilateral sensory urethral hardness) and others – 24 defects.

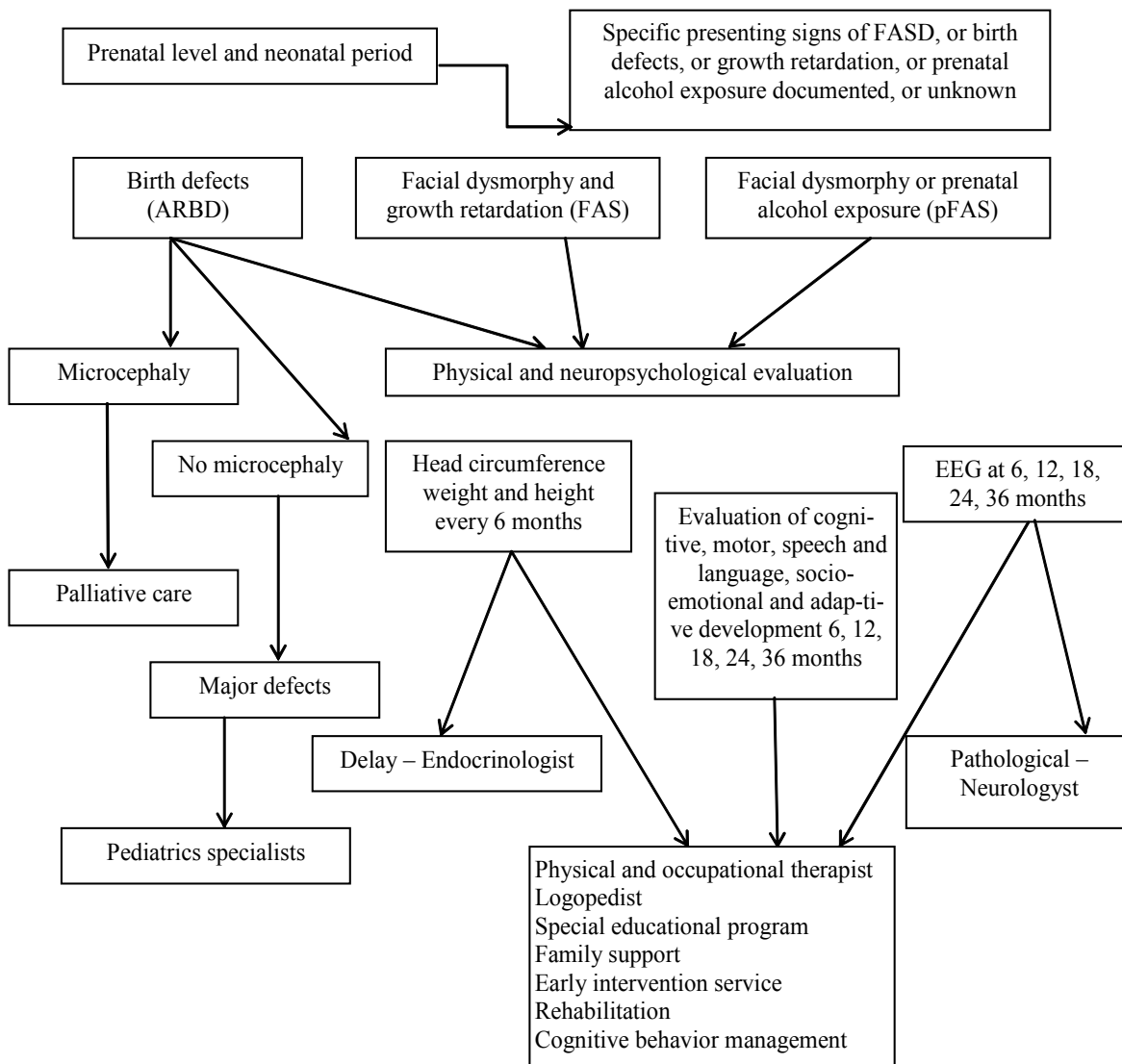
During two years of life among children with ARBD and with developmental delay they over-

came the mass – 8 (50.0 %), the height – 1 (10.0 %), the circumference of the head – 6 (46.1 %) of similar birth rates. Among children with FAS over two years of life caught up with body weight at 12 (60.0 %), height – at 8 (50.0 %), head circumference – at 10 (76.9 %) children. Among children with pFAS before the age of 24 months, they overcame the body weight at 6 (75.0 %), the circumference of the head – at 8 (76.9 %). And children with growth retardation during the first two years of life with pFAS increased. Generally, children with pFAS had the lowest frequency of body weight delay compared to children with FAS and ARBD, but lower frequency of head circumference and body length compared with ARBD.

In the third year of life, all children with ARBD, 53.8 % of children with FAS, and 10 % of children with pFAS had a significant delay of cognitive development. By the age of 24–36 months, 81.8 % of children with ARBD, 38.4 % of children with FAS, and 22.5 % of children with pFAS observed severe delay of motor development; 59 % children with ARBD, 58 % with FAS, and 42 % with pFAS had a severe delay of speech and language development; 77.2 % of children with ARBD, and 38.4 % of children with FAS; 54.8 % of children with pFAS had a severe delay of socio-emotional development. In children of all observation groups, the frequency of «easy lag» and «normal» adaptive development prevailed in the first year of life. By the age of three, the incidence of delay of adaptive development was in 77.2 % of children with ARBD, 46.1 % of children with FAS, and 32.2 % of children with pFAS. The data on the increase in the frequency of «delay» of adaptive development in children with pFAS after the second year of life from 18 to 32 %.

On ECG the proportion of the alpha-rhythm does not change significantly and there is an asymmetric ratio in the left and right hemisphere in children with FASD. There were no differences between EEG in children having of organs and systems dysmorphias. At 21 % of them in the interval of 6–12 months registered pattern of «local slowdown». The results suggest further study of the features of the maturation of the brain in children exposed to adverse effects during intrauterine life.

The data obtained from the monitoring of children of early age from mothers who drinking



Scheme of the Algorithm of the monitoring of young children with prenatal alcohol exposure

alcohol, allowed to create the algorithm of medical care (figure).

**Discussion**

Practice guidelines based on expert clinical judgment and supported by evidence-based research have outlined specific recommendations regarding anticipatory guidance for the management of children with an FASD, as well as key practice points [11]. To help guide primary care providers in establishing a monitoring they can comprehensively care for children with FASD and their families, The American Academy of Pediatrics developed an FASD toolkit [12]. The FASD Competency-Based Curriculum Development Guide for Medical and Allied Health Education and Practice was also developed by

the FASD Regional Training Centers, the Centers for Disease Control and Prevention, and the National Organization on Fetal Alcohol Syndrome to enhance primary care providers' knowledge and confidence to care for children with FASDs [13]. But these programs are in developmental countries. In spite of high medical, social and psychological needs for children with FASD there is in young children the fetal alcohol spectrum disorders are presented as alcohol-related birth defects, fetal alcohol syndrome, and partial fetal alcohol syndrome. Currently there are no special infrastructure, no access to pregnancy women (questionnaire, screening) and no routing access of development of young children in Ukraine. Author speculates that this algorithm

for clinical practices in the diagnosis of FASD will improve the current process and will lead to more efficient and effective care for affected individuals across their lifespan. Although the assessment is meant to provide information about individuals' strengths as well as their challenges and purpose to inform interventions, it is not solely for the purpose of diagnosis.

### Conclusions

1. Children born from mothers using alcohol during early childhood period have a severe delay of different domain of development: cognitive, motor, speech and language, socio-emotional and adaptive even in the absence of birth defects.

2. Developmental delay in children with prenatal alcohol exposure suggests of severe brain damages.

3. The algorithm of monitoring young children with prenatal alcohol exposure will improve medical and social care of young children with prenatal alcohol exposure in low and middle income country as Ukraine.

**Perspectives of research** should be to estimate of the beginning of rehabilitation measures and their impact on improving the development of children with the fetal alcohol spectrum disorders and criteria for early diagnosis of fetal alcohol spectrum disorders.

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**АЛГОРИТМ МОНІТОРИНГУ ДІТЕЙ РАНЬОГО ВІКУ, НАРОДЖЕНИХ ВІД МАТЕРІВ, ЯКІ ВЖИВАЮТЬ АЛКОГОЛЬ**

Оброблено дані 85 дітей раннього віку. Вивчено перинатальні та антропометричні дані, електроенцефалографічні показники та оцінку розвитку за шкалою KID-RCDI-2000. Показано, що найтяжча затримка розвитку була у дітей з уродженими вадами, пов'язаними з алкоголем. Когнітивна, моторна, мовна та мовленнєва, соціально-емоційна та адаптивна сфери були нерозвиненими навіть при фетальному та частковому фетальному алкогольному синдромі. Визначено характерні відхилення ЕЕГ. За даними, отриманими під час моніторингу дітей раннього віку, які зазнали впливу пренатального алкоголю, створено алгоритм медичної допомоги. Застосування алгоритму моніторингу дітей раннього віку, які зазнали пренатальної дії алкоголю, покращить медичну та соціальну допомогу у такій країні з низьким і середнім рівнем доходу, як Україна.

**Ключові слова:** *маленькі діти, розлади спектра алкоголю плода.*

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**АЛГОРИТМ МОНІТОРИНГА ДЕТЕЙ РАННЕГО ВОЗРАСТА, РОЖДЕННЫХ ОТ МАТЕРЕЙ, КОТОРЫЕ УПОТРЕБЛЯЮТ АЛКОГОЛЬ**

Обработаны данные 85 детей раннего возраста. Изучены перинатальные и антропометрические данные, электроэнцефалографические показатели и оценка развития по шкале KID-RCDI-2000. Показано, что тяжелейшая задержка развития была у детей с врожденными пороками, связанными с алкоголем. Когнитивная, моторная, языковая и речевая, социально-эмоциональная и адаптивная сферы были неразвитыми даже при фетальном и частичном фетальном алкогольных синдромах. Определены характерные отклонения ЭЭГ. По данным, полученным в ходе мониторинга детей раннего возраста, которые пренатально подвергались влиянию алкоголя, создан алгоритм медицинской помощи. Применение алгоритма мониторинга детей раннего возраста, подвергшихся пренатальному действию алкоголя, улучшит медицинскую и социальную помощь в такой стране с низким и средним уровнем дохода, как Украина.

**Ключевые слова:** *маленькие дети, расстройства спектра алкоголя плода.*

*Надійшла 02.06.17*

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