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FEATURES OF THE COURSE OF PUBERTY IN GIRLS WITH LOW BIRTH WEIGHT

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65 girls in the pubertal period, living in the conditions of the city of Baku and Nakhchivan, were examined. The average age of the girls was 16.35±0.06 years. All girls were born at term with low body weight. The average weight of a newborn was 2.245±25.98 (1900–2500 g). In girls born with low body weight, a delay in physical and sexual development. The study of hormones revealed statistically significantly low levels of follicle-stimulating hormone (3.0±0.21 mIU/ml), luteinizing hormone (2.3±0.12 mIU/ml), ftee triyodtironin (2.56±0.08 pg/ml), free thyroxine (1.3±0.02 ng/ml), estradiol (30.0±0.9 pg/ml) and high levels of prolactin (17.9±0.22 ng/ml), thyroid–stimulating hormone (2.96±0.19 mIU/ml), dehydroepiandesterone sulfate (4.28±0.19 pg/ml), total testosterone (1.21±0.11 ng/ml), which reflected the presence of clinical and diagnostic manifestations of hypogonadotropic hypogonadism in this contingent of girls which affects the reproductive health of girls in subsequent periods of life.

Key words: puberty, fetal hypotrophy, hirsutism, hypogonadotropic hypogonadism, physical and sexsual development.

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ОСОБЛИВОСТІ ПЕРЕБІГУ ПУБЕРТАТНОГО ПЕРІОДУ У ДІВЧАТОК З НИЗЬКОЮ МАСОЮ ТІЛА ПРИ НАРОДЖЕННІ

Нами обстежено 65 дівчаток, які перебувають у пубертатному періоді та проживають в умовах міста Баку та Нахчівані. Вік дівчаток становив 16,35±0,06 років. Усі дівчатка були народжені від доношеної вагітності із низькою масою тіла. Середня маса новонародженого становила 2245±2598 (1900–2500 г). Встановлено, що у дівчаток, які народилися з низькою масою тіла, відзначається затримка фізичного та статевого розвитку та клініко-діагностичні появи легкого гірсутизму (14,1±0,08). Дослідження гормонів виявило низькі показники фолікулостимулюючого гормону (3,0±0,21 мМЕ/мл), лютеїнізуючого гормону (мМЕ/мл), трийодтироніну (2,56±0,08 пг/мл), вільного тироксину (1,3±0,02 нг/мл), Естрадіолу (30,0±0,9 пг/мл) та високі показники пролактину (17,9±0,22 нг/мл), тиреостимулюючого гормону (2,96±0,19 мМЕ/мл), дегідроепіандростерон-сульфату (4,28±0,19пг/мл), вільного тироксину (1,21±0,11 нг/мл), що відображало наявність у даного контингенту дівчаток клініко-діагностичних проявів гіпогонадотропного гіпогонадизму, що відбивається на репродуктивному здоров'ї дівчаток у наступні періоди життя.

Ключові слова: пубертатний період, гіпотрофія плода, гірсутизм, гіпогонадотропний гіпогонадизм, затримка фізичного розвитку, затримка статевого розвитку.

An urgent problem of modern pediatric gynecology is the study of the peculiarities of the course of puberty of girls born with low body weight.

According to modern literature sources, the term "small for gestational age" (SGA) includes newborns born with a low body weight relative to the expected gestation period [3, 5, 7].

It should be noted that in different countries, the mass-growth indicators of girls are evaluated by different criteria. Infants with low body weight include newborns with mass–growth indicators below 3 percentiles relative to the gestation period. These also include children born at term with low body weight

[6, 8]. According to scientific research, the frequency of children born with low body weight is 5 % and tends to increase annually [1, 2]. According to epidemiological studies, the frequency of underweight children in developed countries is 7 %, in South Asia 41.5 % [9, 10, 11]. According to the literature, the frequency of low–weight children born varies quite widely, which is determined by a variety of reasons, including the geographical location of countries [2, 6, 8].

It was found that in various regions of Nepal, the frequency of underweight children ranges from 10.5 %–72.5 %. In India, the frequency of underweight children ranges from 12.0 %–78.4 %. [2].

The birth of small children is explained, first of all, by the delay in fetal development in the dynamics of pregnancy. The etiological factors of fetal hypotrophy should include 3 groups of factors, including:

1. Maternal factor:
– cardiovascular diseases of the mother, arterial, hypertensive mother's condition:
–renal morbidity;
– acute infectious diseases during pregnancy, including TORCH and QICS infections;
–improper nutrition;
–low body weight of a woman during pregnancy;
–the presence of harmful factors during pregnancy, including the intake
of alcohol, nicotine, narcotic drugs;
–the use of toxic drugs during pregnancy;
–mothers younger than 16 and older than 35;
–accommodation of pregnant women in the highlands;
–ethnicity of the mother (Mongoloid women);
2. Placental factor:
–chronic and acute placental insufficiency (premature
detachment of a normally located placenta);
– placental infarction;
– placental abnormalities;
–absolute and relative shortness of the umbilical cord;
3. Fetus factors;
– chromosomal and genetic defect of the fetus;
– chromosomal abnormalities;
– multiple pregnancies [4, 10, 11].

In recent years, Silver–Russell syndrome has been described in the literature, (Silver–Russell) in which small children were born. The frequency of this syndrome is 1:30,000 children. This is a congenital disease with an autosomal dominant type of inheritance, manifested by a complex congenital anomaly, including a delay in intrauterine development and a delay in the development of the postnatal period, body asymmetry, triangular shape of the facial skull with sharp hypoplasia of the lower jaw, low orientation of the corners of the mouth, the presence of thin lips, shortness of the phalanges of the fingers [1].

It should be noted that the birth of children with low body weight is significantly influenced by race and hereditary affiliation. Among children of the Caucasian race, the frequency of underweight children is significantly lower than among children of the Mongoloid and Negroid races. The birth of small children is also significantly influenced by socio – economic factors.

It should be noted that there is practically no information about the features of the physical and sexual development of girls born with low body weight. There is also no data on the peculiarities of the formation of secondary sexual characteristics during puberty. There is practically no information about the peculiarities of the formation of the hypothalamic–pituitary–adrenal–ovarian system in this contingent of girls.

The purpose of the study was to establish the features of physical and sexual development and the state of the hypothalamic-pituitary-adrenal-ovarian system in girls born with low body weight.

Material and methods. 65 girls in the puberty period living in the conditions of the city of Baku and Nakhchivan were examined. The average age of the girls was 16.35±0.06 (14–17) years. The study of the anamnesis of the girls allowed us to establish that all the girls were born on time with a low body weight. The average weight of the newborn was 2.245±25.98 (1900–2500 g). The age of the mother at birth of the girls was 26.39±0.13 (17–40) years. At the same time, 28 mothers (43.1 %) were over 35 years old, 29 mothers (44.6 %) were aged 19 to 35 years, 8 mothers (12.3 %) were aged 17–18 years.

The examination of the girls included the study of the history of somatic and gynecological diseases. To assess physical development, mass-height indicators, measurement of chest circumference,

shoulder width, arm span, leg length, as well as measurement of the external dimensions of the bone pelvis were determined. The circumference of the chest was determined by the position between inhalation and exhalation at the level of the xiphoid process and the lower corners of the shoulder blades. The width of the shoulder girdle was measured with a pelvis, while several measurements were carried out and the largest width of the shoulder girdle was estimated. The length of the leg was measured by the distance from the large trochanter of the thigh bone to the floor. The results obtained were compared with the indicators of physical development of practically healthy women (n=30).

Table 1

Indices of physical development of girls born with low body weight (M±Se)

Anthropometric indices	Comparison Group		P
	Girls born with low body weight (main group) (n=65)	Practically healthy girls (comparative group) (n=30)	
Height, cm	147±0.11 (131–161)	157.8±1.4 (143–168)	<0.05
Weight, kg	45.3±0.31 (38–53)	56.4±2.21 (46–72)	<0.05
Arm span, cm	149.3±0.03 (136–157)	176.9±1.13 (162–190)	<0.05
Shoulder width, cm	32.7±0.08 (30–41)	39.6±1.21 (32–46)	<0.05
Length of the lower limbs, cm	76.8±0.21 (70–91)	96.7±2.1 (80–104)	<0.05
Chest circumference, cm	71.5±0.9 (48–76)	96.2±0.11 (88–105)	<0.05
Girsut number	14.1±0.08 (10–15)	8.3±1.8 (6–10)	<0.05
External size of the pelvis, cm: –Dist. spinarum	20.6±0.31 (19–23)	24.8±0.11 (22–26)	<0.05
–Dist. cristarum	22.1±0.19 (19–24)	26.2±0.11 (23–28)	<0.05
–Dist.trochanterica	24.5±0.09 (20–25)	29.9±0.19 (27–30)	<0.05
–Conj. externa	16.7±0.29 (15–18)	20.2±0.12 (18–22)	<0.05

The assessment of sexual development included the determination of the severity of secondary sexual characteristics on the J.Tanner scale, while the stages of development of mammary glands, axillary and suprapubic hair were evaluated. The severity of hair loss in the examined girls was assessed on the Ferriman–Gallwey scale. At the same time, the girsut number was determined by the sum of the indifferent and hormonal numbers. The standards of the indicators were considered to have a girsut number of fewer than 12 points, with an average of 4.5=0.1 points.

The study of the hypothalamic-pituitary-adrenal-ovarian system included the determination of follicle-stimulating (FSH), luteinizing (LH), thyroid-stimulating hormones (TSH), prolactin (Prl), estradiol (E2), total testosterone (T $_{TOTAL}$), dehydroepiandesterone sulfate (DHEA-C), cortisol (K), 17-hydroxyprogesterone (17-HPN), free thyroxine (T4).

All hormones were determined by the enzyme immunoassay on an automatic immunochemical analyzer Abbott Architect i1000SR (USA) in the first phase of the menstrual cycle with the established menstrual cycle.

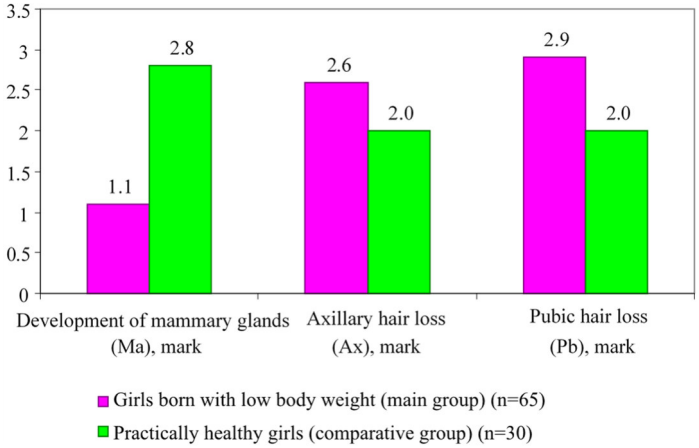

Fig. The severity of the development of secondary sexual characteristics according to the J. Tanner scale in girls born with low body weight.

The obtained results were subjected to statistical processing. For each group, the arithmetic mean (m), the mean square deviation of the arithmetic mean (b), the standard error (Se), as well as the minimum (min) and maximum (max) values of the series were determined. The nonparametric Wilcoxon (Mann–Whitney) criterion was used to compare and determine the reliability of differences in groups and subgroups.

Results of the study and their discussion. As a result of the study, anthropometric indicators of the physical development of girls born with low body weight were studied. (table 1).

As can be seen, height, weight, arm span, shoulder width, length of lower limbs, chest circumference, external pelvic size in girls born with low body weight are significantly lower than similar indicators of practically healthy girls (P<0.05). At the same time, significantly high indicators of the hirsute number (P<0.05) were noted. The features of the development of secondary sexual characteristics in girls born with low body weight are shown in Figure.

As can be seen, there are significantly low rates of mammary gland development and significantly high rates of hair loss in the axillary and suprapubic regions in girls born with low body weight (P<0.05).

As a result of this study, the state of the hypothalamic–pituitary–adrenal–ovarian system in this contingent of girls was studied. The indicators of FSH, LH, TSH, Prl, E2, DHEA-C, T3, T4, 17-HPN, K in blood serum were determined. The indicators of these hormones were compared with those of practically healthy girls. The results of the study of hormones in the hypothalamic-pituitary-adrenal-ovarian system are presented in table 2.

Table 2

Hormone levels during puberty in girls born with low body weight (M±Se)

Hormones	Comparison Group		P
	Girls born with low body weight (main group) (n=65)	Practically healthy girls (comparative group) (n=30)	
FSH, mME/ml	3.0±0.21 (0.12–9)	5.21±0.09 (35–8.9)	<0.05
LH, mME/ml	2.3±0.12 (0.3–6.6)	5.13±0.12 (3.0–8.9)	<0.05
Prl, ng/ml	17.9±0.22 (6.20–35)	4.46±0.19 (1.6–16.9)	<0.05
TSG, mME/ml	2.96±0.19 (0.26–7.2)	2.1±0.09 (0.7–3.26)	<0.05
Cortisol, ng/ml8^{00}–10^{00}	140±7.2 (52.5–210)	121.33±23.1 (75–190)	<0.05
$T_{3\ FREE}$, pg/ml	2.56±0.08 (1.1–3.62)	2.9±0.03 (1.1–4.5)	<0.05
$T_{4\ FREE}$, ng/ml	1.3±0.02 (0.7–1.59)	0.48±0.22 (0.12–1.60)	<0.05
DHEA-C, pg/ml	4.28±0.19 (0.6–9.0)	1.97±0.25 (0.6–3.5)	<0.05
17-HPN,ng/ml	0.41±0.03 (0.21–2.11)	0.31±0.01 (0.07–3.0)	<0.05
$Э_2$, pg/ml	30.0±0.9 (12.4–69.1)	135.31±27.1 (100–170.3)	<0.05
T_{TOTAL}, ng/ml	1.21±0.11 (0.15–2.8)	0.11±0.03 (0.06–1.6)	<0.05

As can be seen, girls born with low body weight during puberty have significantly low indicators of FSH, LH, $T3_{FREE}$, $T4_{FREE}$, E2 and high indicators of Prl, DHEA-C, 17-HPN and T_{TOTAL}, which reflects the clinical and diagnostic manifestations of hypogonadotropic in girls born with low body weight hypogonadism. According to the literature, the frequency of intrauterine fetal development delay (IVD) ranges from 3–5 % and varies depending on the somatic, obstetric history of a pregnant woman. It has been established that in the complicated course of pregnancy, the frequency of ASD ranges from 10–25 %, in preeclampsia of moderate severity and severe eclampsia is 31–44 % [2].

The study of the features of the course of further periods of life, including puberty, the reproductive period is a new direction in scientific research.

It has been established that children born with ASD have a high incidence of intestinal infections and damage to the central nervous system. In the literature there is evidence of a high frequency of cerebral dysfunctions of cerebral palsy, motor disorders, cognitive disorders. Children born with ASD have learning problems. These children have a high incidence of chronic diseases, impaired physical development, which certainly affects the reproductive health of the future generation [4, 5, 8].

In our study, it was found that girls born with low body weight have a delay in physical and sexual development, which subsequently affects the features of the formation of reproductive function and requires the elimination of the causes of intrauterine development delay in the dynamics of pregnancy.

Conclusion

Thus, studies of the course of puberty in girls born with low body weight allowed us to establish a delay in physical development, a lag in the development of mammary glands, an increase in axillary-suprapubic hair (P<0.05). This contingent of girls had manifestations of mild hirsutism.

The study of hormones revealed statistically significantly low indicators of FSH, LH, $T3_{FREE}$, $T4_{FREE}$, E2 and high indicators of Prl, TSH, DHEA-C, T, which reflected the presence of clinical and diagnostic manifestations of hypogonadotropic hypogonadism in this contingent of girls and influenced the state of reproductive health of girls in subsequent periods of life.

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PROGNOSTIC CRITERIA FOR THE RISK OF BRONCHIAL ASTHMA IN CHILDREN WITH OBSTRUCTIVE BRONCHITIS

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The purpose of the study was to identify prognostic criteria for the formation of bronchial asthma in children with obstructive bronchitis. The material for the work included the data of a retrospective examination of 100 children with recurrent obstructive bronchitis aged from 1 to 7 years (the first group). The second group included 89 children diagnosed with bronchial asthma. All children underwent a comprehensive examination, including the copying of information from medical records, questioning of parents, analysis of risk factors, assessment of allergic history and examination of laboratory parameters. The diagnostic test for the absolute number of eosinophils showed high specificity of 84.9±4.9, and sensitivity of 63.6±14.5. The relative number of eosinophils showed high sensitivity and specificity: 81.8±5.2 and 84.1±4.0, respectively. Testing of immunoglobulin E showed absolute sensitivity of 100.0±0.0, specificity 72.2±7.5. Thus, high prognostic efficiency in the development of asthma in children with obstructive bronchitis has parental allergic diseases, urogenital infections and maternal preeclampsia during pregnancy, birth injury and asphyxia in the neonatal period, absolute and relative eosinophilia, hyperimmunoglobulinemia E.

Key words: bronchial asthma, eosinophilia, hyperimmunoglobulinemia E, predictive indices

Т.Т. Панахова

ПРОГНОСТИЧНІ КРИТЕРІЇ РИЗИКУ БРОНХІАЛЬНОЇ АСТМИ У ДІТЕЙ З ОБСТРУКТИВНИМ БРОНХІТОМ

Метою дослідження було виявити прогностичні критерії формування бронхіальної астми у дітей із обструктивним бронхітом. Матеріалом для роботи послужили дані ретроспективного обстеження 100 дітей з рецидивним обструктивним бронхітом віком від 1 до 7 років (перша група). До другої групи увійшли 89 дітей із діагнозом бронхіальна астма. Всім дітям було проведено комплексне обстеження, що включає копіювання відомостей із медичних карток, опитування батьків, аналіз факторів ризику, оцінку алергологічного анамнезу та дослідження лабораторних показників. Діагностичний тест на абсолютну кількість еозинофілів показав високу специфічність 84,9±4,9 та чутливість 63,6±14,5. Відносна кількість еозинофілів також мала високу чутливість та специфічність: 81,8±5,2 та 84,1±4,0, відповідно. Дослідження імуноглобуліну Е показало абсолютну чутливість 100,0±0,0, специфічність 72,2±7,5. Таким чином, високу прогностичну ефективність у розвитку бронхіальної астми у дітей з обструктивним бронхітом поряд з алергічними захворюваннями батьків, урогенітальними інфекціями та гестозом матері під час вагітності, родовою травмою та асфіксією в неонатальному періоді мають абсолютну та відносну еозинофілію, гіперімуноглобулінемію Е.

Ключові слова: бронхіальна астма, еозинофілія, гіперімуноглобулінемія Е, прогностичні показники.

The problem of timely diagnosis of bronchial asthma (BA) is one of the most urgent problems in modern pediatrics [5, 9].

Diseases of the lower respiratory tract in children, especially in children of young age are often accompanied by the development of an obstructive syndrome [4, 13]. In some children, we meet a recurrent bronchial obstruction due to repeated episodes of respiratory infections leading to the formation of bronchial hyperactivity and the implementation of bronchial asthma; in other children, the bronchial obstruction syndrome might be transient in nature and disappearing of symptoms occurs at early school