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COMPARATIVE DYNAMICS OF UTERINE ECHO DIMENTIONS IN HEALTH AND SECONDARY AMENORRHEA

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ABSTRACT

Protection of reproductive health of adolescents and youth, i.e., individuals aged 15 to 24 years, is a primary goal of a family planning service as according to WHO estimations (1995), the youth aged 15 to 24 years makes over 14% of the overall population in developed countries.

Disorders of a menstrual cycle take a leading place among gynaecologic pathologies of adolescent girls. At the same time, according to WHO data, about 30% of schoolchildren suffer from iron deficiency anemia, which takes one of the first places in the structure of somatic pathologies. On the basis of maternity welfare centre No. 2, 2,456 girls aged 15 to 18 years were examined, and the frequency of occurrence and structure of disorders of a menstrual cycle was studied. In addition to standard methods of examination, all patients undertook USI of small pelvis organs; indicators of a hormonal status, complete blood test, transport fund, and iron stocks were investigated. The study included 285 girls, with various disorders of a menstrual cycle, who had no history of iron deficiency states and exacerbation of chronic diseases. The control group included 69 adolescent girls with a regular menstrual cycle. The most common type of disorder of a menstrual cycle in subjects examined was dysmenorrhea I. Iron deficiency anaemia was found in 5.3% of the subjects examined. The frequency of occurrence of moderate anaemia and latent deficiency of iron of 46.7% and 11.9%, respectively, attracts our attention. Well-timed diagnostics of the states mentioned in adolescent girls can prevent subsequent development of reproductive and somatic pathologies.

UDC CODE & KEYWORDS

■ UDC: 618 ■ Reproductive health ■ Chronic diseases ■ Gynaecologic pathologies ■ Small pelvis organs

INTRODUCTION

The state of reproductive health of adolescent girls is one of vital issues. Data of official statistics suggest that eight out every nine girl suffer from that or other gynaecologic disease, and the percentage of absolutely healthy girls have decreased from 28.6% to 6.3% during the past 10 years.

As Uvarova (2005) wrote that currently, the state of reproductive health of adolescents is one of few most discussed subjects not only among specialists, but also by wide public, and that stresses a special importance and urgency of the problem.

According to various sources, a frequency of gynaecologic diseases in adolescent girls ranges from 7.1 to 64.3%.

As Kokolina (2005) and Bogdanova (2000) wrote, the structure of gynaecologic morbidity in girls depends on age. Inflammatory diseases of genitals occur mainly during a neutral period of childhood while menstrual function disorders are primary pathology of a pubertal period. Secondary amenorrhea (SA) is absence of spontaneous menses during 6 months and more following a period of regular or irregular menses. Some authors claim that SA takes 4.2% in the structure of menstrual function disorders in girls during the pubertal period and according to other authors this figure equals 8.1%.

As Ailamazyan (2008), Bogdanova (2000), and Evtushenko, Kutsenko, & Artyomov (2004) wrote, dysmenorrhea is the most common gynaecologic disease in girls of juvenile age. The frequency of dysmenorrhea in girls ranges 43% to 90%, and in every second girl the disease results in a fall of working capacity and social adaptation. Dysmenorrhea is a cyclic pathological process manifesting itself as pains in the lower stomach on days of menses and is accompanied by a complex of psychoemotional, vegetative vascular and endocrine metabolic disorders. In most cases painful menstruation appears to be one of symptoms of a gynaecologic, somatic or psychosomatic disease and sometimes and their combination. In dysmenorrhea caused by neuroendocrinal factors, changes of a psychoemotional state occur in connection with similarity of mechanisms of regulation of endocrine and pcyhovegetative functions existing in structures of the visceral brain.

As Zakharova (2000) wrote, Dysmenorrhea is subdivided into primary and secondary. Usually primary dysmenorrhea occurs with menarche or 1-1.5 years following it when ovulatory cycles are being formed. Secondary dysmenorrhea is a consequence of organic pathological processes of internal genitals. Combination of hormonal, neurovegetative, metabolic, psychoemotional disorders in dysmenorrhea requires a comprehensive differentiated approach to the disease treatment. Wide introduction of a drug and non-drug therapy into clinical practice has not caused any appreciable fall in the frequency of dysmenorrhea in girls that is probably stipulated by lack of a differentiated approach to treatment and correction of neurovegetative, endocrine metabolic and psychoemotional disorders.

As Ailamazyan (2008), Bogdanova (2000), and Evtushenko et al. (2004) wrote, the main treatment principle of primary dysmenorrhea is pharmacotherapy aimed at reduction of prostaglandin production and normalization of a menstrual cycle. Proceeding from a theory of dysmenorrhea occurrence, the basis of which is laid by a disorder in synthesis and exchange of arachidonic acid and products of its metabolism (prostaglandins, leukotrienes, thromboxanes, etc.), many researchers consider that utilisation of nonsteroid anti-inflammatory drugs (NSAID) is sufficient in combination with antioxidants.

A hypothesis on reduction of a progesterone level in a lutein phase of a menstrual cycle underlies a series of pathogenetic mechanisms of dysmenorrhea development and in this respect high efficacy of ndomethaci utilisation and combined oral contraceptives in dysmenorrhea treatment has been proved. A change in the ratio of sexual steroids during the premenstrual period (estradiol and progesterone) is accompanied by a change in a rate of free fat acid oxidation; enhanced release of oxytocin, vasopressin, ndomethac, relaxin and biogenic amines in the myometrium; activation of synthesis of cyclooxygenase and prostaglandinsynthetase. These processes potentiate formation and release of prostaglandins. As Kokolina (2005) wrote, Hyperprostaglandinemia promotes myometrial hypoxia and ischemia resulting in spastic uterine contractions causing a pain syndrome. It is assumed that elevated concentration of PG E2 on the background of lowered secretion of progesterone is of major importance in genesis of dysmenorrhea. For occurrence of painful sensation, irritation of nerve terminals with biologically active substances of a group of kinins, prostaglandins as well as K and Ca ions, normally located in cells is required. During menses integrity of cellular membranes of the endometrium is impaired and biologically active substances enter the intercellular space, irritating the nerve terminals. A rise in a level of free calcium stimulates uterine production of F2a prostaglandins. As a result of the influence of an increased concentration of prostaglandins in blood and accumulation of salts of potassium and calcium in tissues, ischemia may occur in other organs and tissues resulting in occurrence of such symptoms as headache, vomiting, diarrhoea, tachycardia, etc. Utilisation of drugs with antiprostaglandin effect results in a decrease of a pain syndrome almost in 80% of women with dysmenorrhea. Prostaglandinsynthetase inhibitors are NSAIDs (ndomethacin, ibuprofen, nimesulide, naproxen, novigan, etc.) and they are widely used in treatment of dysmenorrhea.

As Ozyorskya (2007), Uvarova (2005), Kokolina (2001), and Kurashvili (2001) wrote, one of common methods of examining female sexual system organs is ultrasonic scanning, which allows the discovery of peculiarities in position, configuration, shape, sizes, as well as abnormalities, malformations, and diseases associated with the uterus and ovaries.

Studying of uterine echo dimensions in SA in the age aspect has not received sufficient coverage in medical literature. The importance of age normal ranges of echo dimensions in SA will help in achieving more exact diagnostics and a choice of method of treatment in the pathology.

Research objective

To identify age changes in uterine echo dimensions in health and secondary amenorrhea.

Material and method

The material for study is based on 70 echograms obtained from girls with secondary amenorrhea and 64 echograms received from practically healthy girls of 17 to 23 years old. Ultrasonic device “CHISON-8300” with frequency sensors with a range 3.5 to 5.5 mHz was used. Standard uterine echo dimensions were determined according to recommendations by Mitkov (1996) and Kosim-Khojaev (2012). Digital data obtained were processed using a variation statistical method (according to Lakin, 1980).

The data obtained during the study were processed statistically on personal computer Pentium-IV with Microsoft Office Excel-2003 software including utilisation of built-in functions of statistical management.

Results and discussion

The greatest specific gravity in the structure of somatic pathology of adolescent patients with secondary amenorrhea is made by an adenoid disease (37.5%) and other diseases of ENT organs (chronic rhinitis and genyantritis) (30.2%), GIT diseases (28.5%), diseases of cardiovascular system (vegetative-vascular dystonia was the most frequent pathology) (29.9%). More than a half of adolescents (57.4%) had combined pathologies.

72% of girls notes that development of a hypomenstrual syndrome and secondary amenorrhea is associated with a conscious violation of dietary pattern to “get slim”. Nutrition changes were of various characters: from a quite balanced dietary ration to a full refusal of taking food containing fats and carbohydrates; 6 adolescents stuck to a vegetarian diet.

A distinct direct relation between a rate in a body weight loss and a speed of development of menstrual function disorders, i.e. formation of secondary amenorrhea was observed.

14 adolescents did not relate their menstrual cycle disorder and development of oligomenorrhea with a body weight loss.

Among background psychoemotional states attention was drawn with increased academic loads in 18 adolescents (51.1%), physical overloads, playing sports in 11 (41.9%), adverse situations in the family in 4 (19.3%), conflicts with classmates or relatives in 6 cases (25.8%).

Table 1: Comparative characterisation of uterine echo dimensions in health and secondary amenorrhea (X ± m, mm)

Age, years	Length		Anteroposterior size		Width		Thickness of fundus		Body thickness		Length of the neck	
	Ref. value	SA	Ref. value	SA	Ref. value	SA	Ref. value	SA	Ref. value	SA	Ref. value	SA
17	44.6±0.22	42.6±0.13	27.9±0.68	26.8±0.28	43.5±0.25	42.0±0.18	16.49±0.19*	15.35±0.18	15.07±0.21*	14.35±0.18	23.6±0.16	22.5±0.13
18	44.7±0.38	43.4±0.28	30.75±0.44 **	28.3±0.27	41.6±0.32*	41.1±0.19	17.14±0.08	17.13±0.1	17.53±0.15*	17.13±0.1	24.45±0.27*	22.6±0.15
19	45.5±0.23*	43.9±016	32.2±0.41*	29.0±0.62	41.55±0.19	40.4±0.15	17.77±0.11*	17.5±0.07	17.21±0.14*	17.5±0.07	24.41±0.25	23.0±0.21
20	48.8±0.29 **	47.3±0.15	33.8±0.28	28.9±0.24	47.15±0.29 **	45.3±0.22	17.77±0.11	17.75±0.21	17.96±0.1**	17.75±0.21	24.55±0.43	24.3±0.2
21	49.2±0.29*	48.3±0.18	29.91±0.3	29.2±0.24	46.65±0.28	45.7±0.13	17.77±0.11	17.34±0.11	17.96±0.1	17.94±0.11	24.85±0.49	24.3±0.38
22	49.63±0.23	48.7±0.14	30.4±0.27	29.4±0.21	47.45±0.22*	46.1±0.17	18.52±0.11*	18.35±0.11	19.14±0.09*	18.45±0.11	26.3±0.27*	25.8±0.16
23	49.8±0.22	8.8±0.17	30.2±0.34	29.7±0.2	47.65±0.25	4641±0.21	18.47±0.11	18.29±0.08	19.0±0.11	25.9±0.14	25.9±0.15	25.9±0.16

Note: SA – Secondary amenorrhea.
* Reliability of differences P <0.05

Source: Authors

In the opinion of adolescents and their mothers, a disorder of a menstrual function was caused by such factors as: acute psychoemotional stress (entering high schools, examinations) in 7 girls (47.6%); a state following surgical interventions (of non-gynaecologic character) in 2 girls (16.6%); severe acute infectious and viral diseases in 4 girls (33.3%); and post-trauma states in 1 girl (8.3%).

The studies demonstrate that the uterine length in secondary amenorrhea in the age periods investigated increases from 42.6±0.13 to 48.8±0.17 mm, the anteroposterior size increases from 26.8±0.28 to 29.7±0.2 mm, and width from 42.0±0.18 to 46.4±0.21 mm. (Table 1)

However, by comparing these data with a reference range, it should be noticed that the uterine length in SA is less than the reference range from 0.7 to 2.2 mm, the anteroposterior size - from 0.7 to 3.2 mm, and width - from 0.5 to 3.5 mm. The thickness of the uterine body in SA is also less than the reference range, viz., from 0.3 to 1.6 mm, length of the neck - from 0.2 to 1.8 mm. As to the thickness of the uterine fundus in SA is concerned, at the age of 18, 20, 21 and 23 years of it is almost identical to the reference value and in other age periods it is less by 0.2 to 1.4 mm than the reference value. It appears from the described above that in SA in all age ranges studied the greatest difference is noted in uterine length, thickness of its body and the length of the neck - at the age of 17, 18, and 19; the uterine width at the age of 17, 20, and 22, and at other age the difference is less.

The data show that on the background of a fall in body weight, a decrease in the uterine size and the volume of ovaries in adolescents with amenorrhea is registered. These indicators are at the lower border of age sizes. No changes were observed in these indicators in terms of mean age ones in a group of adolescents without body weight loss. Besides, in all girls the size of M-echo corresponded to Phase 1 of the menstrual cycle; the maximum size of follicular inclusions did not exceed 11 mm. In other words, in a body weight loss and development of secondary hypothalamic-pituitary amenorrhea, not only hormonal and functional disorders but also changes of organic character occur.

Discussion

Comparing the data obtained and those of medical sources, it is possible to note that our data are much less than those obtained by Evtushenko et al. (2004). According to their data, the uterine length was 6 mm less, anteroposterior - 9.0 mm, and width 1.0 mm less than reference values. According to our results, a difference between the reference range and that of uterus in SA makes respectively 2.0x4.9x1.8 mm. This divergence is associated with the fact that the researchers mentioned studied girls with SA the mean age of who made 21.2±1.2 years, while we studied girls at the age from 17 to 23 years. We completely agree with the opinion of Zakharova (2000) and Kokolina (2001) who noted that an ultrasonic picture in sexual development retardation differs with a decrease in uterine sizes and its neck in comparison with age reference range.

Conclusion

In secondary amenorrhea, the uterine length is 2.0 mm shorter; the anteroposterior size is 4.9 mm smaller; the width is 1.8 mm shorter; and the length of the uterine cervix is 1.85 mm shorter in comparison to an age reference value.

In SA, the greatest uterine difference in echo dimensions with age reference value is noted in length, anteroposterior size, width, and length of the uterine cervix from the age of 17 to 20 years.

Adolescents with a menstrual cycle disorder should be prescribed health-improving measures:

Observance of a work and rest regimen. In amenorrhea on the background of body weight loss: a high-caloric diet, enzymatic drugs. In overweight: a low-calorie diet with restriction of fats and carbohydrates, inhibitors of intestinal lipase, biologically active alimentary additives, medically dosed starvation. Sedatives, general tonics, vitamin therapy including cyclic one. Antihomotoxic therapy. Effects produced by preformed physical factors, acupuncture. Hormonal therapy if indicated. In a thyroid function disorder: thyroid gland hormones. If congenital dysfunction of the cortex of adrenals is present, glucocorticoids should be used.

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