

HYPOMENSTRUAL SYNDROME IN ADOLESCENT GIRLS AS A RESULT OF REPRODUCTIVE DYSFUNCTION IN THEIR MOTHERS

LITERATURE REVIEW



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INTRODUCTION

The nation's reproductive health problems are closely related to the effective health improvement of adolescent girls, which is one of the priority areas of modern medical science [4, 11, 27].

By now, it is no longer in doubt that the puberty period in a girl leaves an imprint on the functioning of the reproductive system in all further periods of a woman's life. According to the literature, menstrual dysfunctions that occurred of adolescence account for 20% in the structure of gynecological diseases in adolescent girls and often persist in the future, causing infertility, obstetric pathology, perinatal losses, and other reproductive health disorders in childbearing age [12, 21, 24, 32, 38, 40].

As a result, girls born from women with menstrual and reproductive disorders are significantly more likely to have reproductive system pathology than children from healthy mothers, thus closing the so-called "sick girl – sick woman – sick mother – sick child" vicious circle [14, 20].

According to domestic literature, irregular menstruation and amenorrhea are in the first place among menstrual dysfunctions in adolescent girls in the structure of gynecological morbidity is up to 45%. The second place in the structure of menstrual dysfunctions in adolescent girls is occupied by abnormal uterine bleeding (up to 20%). The third place is taken by hypothalamic syndrome and dysmenorrhea – 10% [21, 32, 38].

Hypomenstrual syndrome (HMS) is the reason for more than 60% of visits to an adolescent gynecologist. In this case, such disorders as oligomenorrhea and secondary amenorrhea are most often registered [32, 39].

The steady increase of HMS among adolescent girls is one of the most actual medical and social problems of modern medicine, which is not only associated with reproductive disorders in the future, but also with the high frequency of comorbid conditions that significantly reduce the quality of young patient's life [8, 25].

Unfortunately, only 6–15% of adolescents go to a doctor, and the number of visits among young women increases only due to the addition of the infertility problem [5, 20].

MENSTRUAL DYSFUNCTIONS RISK FACTORS

Menstrual dysfunctions risk factors are conventionally divided into social and medico-biological.

Social factors that can cause menstrual function disorders include:

- technogenic pollution of the environment;
- raising a girl in a family of social risk or without the participation of parents;
- intensive training (sport);
- acute and chronic psycho-emotional stress;

Emotional and physical stress is recognized as one of the important causes of menstrual disorder. Even excessive sports, the purpose of which is to maintain general health and endurance, have a "flip side of the coin" – HMS, irregular menstruation [10, 13, 16].

Biomedical risk factors include:

- burdened heredity in reproductive system dysfunction of non-inflammatory genesis on the maternal side;
- immaturity of the mother's reproductive system during pregnancy;
- burdened perinatal history (miscarriage risk, long-term early preeclampsia, cesarean section, fetal hypoxia, and distress syndrome of the newborn);
- premature, early (before 11 years), or later (after 14.5 years) menarche;
- anorexia or obesity, significant loss of body weight in a short time;
- concomitant chronic extragenital pathology, especially pathology of the central nervous system, endocrine, digestive and urinary systems;
- surgical interventions with anesthetic support (tonsillectomy, appendectomy, etc.) before menarche or in the first year after menarche [20, 23, 27, 38].

Girls with HMS against a background of body mass deficit have some clinical features. Every third patient with HMS and reduced body weight has later menarche and oligomenorrhea/secondary amenorrhea begins with the period of menarche or in the first year of the menstrual function formation in 86.4% of cases. The revealed clinical features can be a consequence of estrogen deficiency, as well as the formation of hyperandrogenism [19, 22]. About half of adolescents suffering from bulimia nervosa have

hypothalamic dysfunction with oligomenorrhea or menstrual irregularities. The latter consequence is related to nutritional restriction indexes that are not associated with low body weight [29]. Although body weight remains in the normal range, amenorrhea may occur in 7 to 40% of cases. Irregular menstrual cycles (oligomenorrhea) are more frequent, in a variable proportion of 37 to 64%. The mechanism of action appears to be related to hypothalamic-pituitary dysfunction and subsequently reduced estradiol, luteinizing hormone (LH), noradrenaline levels, as well as with altered LH pulses [36].

Until the end of puberty, even with an established regular menstrual cycle, the reproductive system has significant lability and is especially sensitive to the effects of unfavorable exogenous and endogenous factors. At the age of up to 18–20 years even small stressful influences (hyperinsolation, physical overload, psycho-emotional stress, episodes of acclimatization with a change in climatic and geographical zone and time zones, acute respiratory diseases) can have a pronounced damaging effect on the reproductive system.

THE “PERINATAL TRACE” IN PEDIATRIC GYNECOLOGY

It often turns out that family predisposition in the formation of menstrual function played an important role, which confirms the concept of Y.A. Gurkin about the “perinatal trace” in pediatric gynecology. Therefore, girls born from mothers with endocrinopathies in history are at risk of menstrual and reproductive disorders [14].

It must be remembered that the period of puberty is critical in a woman's life because all the structures and functions of the female reproductive system are being formed. The mechanism that provides the fullness of the menstrual cycle is extremely complex and includes a complex relationship between the hypothalamus-pituitary-ovary system and the uterus. Its formation continues until the end of puberty [11].

PATHOGENESIS AND CLINICAL MANIFESTATION OF HYPOMENSTRUAL DISORDERS

It has been proven that the physical development of 12–13 years old girls has a more intense and uneven pace than in older girls, manifested by a sharp increase in the concentration of prolactin and free thyroxin until the end of the reproductive system development with a constant T_3 concentration and a high concentration of cortisol. In older girls (14–17 years old), there is a gradual increase in the concentration of most hormones against the background of a decrease in T_3 level. The formation of a stable hormonal functional system ends before the end of puberty (17–18 years) and manifests in a natural increase in correlations between indicators of hormonal status with neurovegetative and anthropometric indicators [1, 38].

The reason that leads to menstrual dysfunction during puberty is a violation of the pulsating rhythm of secretion of gonadotropin-releasing hormone of the hypothalamus, which is a highly specialized structure that connects the central nervous system and the endocrine system. Synthesis and release disorders of the gonadotropic hormones (LH and follicle-stimulating hormone (FSH)) leads to impaired folliculogenesis in the ovaries because of insufficient gonadotropic stimulation from the pituitary gland and impaired steroid genesis in the

ovaries (low estrogen levels, progesterone deficiency). That is, the hypothalamic-pituitary complex and the ovaries do not integrate each other, do not synchronize their functions therefore and do not provide a sufficient level of estradiol secretion, which is capable of causing an ovulatory LH release. Completing this stage of puberty, positive feedback is not formed in girls, which leads to the development of clinical manifestations of various menstrual dysfunctions. The degree of the menstrual cycle disorders is determined both by the level and depth of disturbances in neurohormonal regulation and by changes in the target organs of the reproductive system [1, 17, 38].

Understanding changes in vaginal bacterial communities over a woman's life span is essential to comprehending normal development, physiological function and health, and disease susceptibility [15]. Until now, vaginal microbiota before puberty was thought to be relatively stable assemblages of aerobic, anaerobic, and enteric bacterial populations. It is believed that immediately after birth, the vagina is filled with thick mucus and therefore sterile. Within 1–4 days after birth, active desquamation and destruction of vaginal epithelial cells occur in the vaginal epithelium due to the active elimination of maternal sex hormones. The destruction of cells is accompanied by the release of glycogen, which break down into maltose and dextrose. These products are an ideal growth substrate for aerobic and facultative anaerobic microorganisms. In the vaginal microflora of newborn girls, acidophilic *Lactobacillus spp.* predominate, most of which (85%) are represented by peroxide-forming lactobacilli. A small part is made up of *Bifidobacterium* – up to 10%, and *Peptostreptococcus* – up to 5%. The accumulation of lactic acid in the process of vital activity causes a shift in the acid-base balance of the vaginal environment of a newborn girl to the acidic side (pH = 4.0–4.5). A significant drop in estrogen levels occurs within 10 days of a girl's birth. Epithelial cells lose their ability to proliferate and synthesize glycogen. The epithelium becomes thin. As a result of a decrease in the level of organic acids, the pH of the vaginal environment rises from 3.8–4.5 to 7.0. Strictly anaerobic bacteria begin to dominate in the microflora [35, 37]. In healthy girls 5–8 years old, epidermal and saprophytic staphylococci are most often found as representatives of aerobic and facultative anaerobic microflora, less often *Escherichia coli* and *Enterobacteriaceae*, in isolated cases *Bifidobacterium*. *Bifidobacterium* dominate in the composition of microorganisms (84.2%). Lactobacilli appear in moderate numbers after the age of 8 years. In puberty, from the moment of activation of the synthesis of estrogens by the ovaries, the thickness of the epithelial layer increases, glycogen accumulates in the cells of the vaginal epithelium, and the number of receptor sites for adhesion of lactobacilli increases on the surface of the vaginal epithelium. From this point on, lactobacilli again become the dominant microorganisms in the vagina. Familiar bacterial species associated with the vaginal microbiota of adults have commonly been found in girls, including *Lactobacillus crispatus*, *Lactobacillus iners*, *Lactobacillus gasseri*, *Lactobacillus jensenii* and, in particular, *Gardnerella vaginalis* [33, 34]. After menarche the vaginal microbiota of healthy adults is typified by high numbers of homofermentative lactic acid bacteria, which contribute to acidification of the vaginal microenvironment through the production of lactate and other

organic acids. Familiar bacterial species associated with the vaginal microbiota of adults were commonly found in girls, including *Lactobacillus crispatus*, *Lactobacillus iners*, *Lactobacillus gasseri*, *Lactobacillus jensenii* and, notably, *Gardnerella vaginalis*. Following menarche, vaginal pH often remained above what is considered typical in healthy adult women even when lactobacilli were present in high proportions, raising the possibility that total bacterial loads may not reach levels seen in adults until later in puberty [15, 33, 35]. It is known that girls with menstrual irregularities have changes in vaginal microbiocenosis, which lead to the formation of ovarian dysfunction, endometrial hyperplasia, disrupting the direct and inverse relationship between the central and peripheral links of hormonal homeostasis [13]. Therefore, it is so important to carry out an adequate assessment of the state of the vaginal biotope, timely correction of the revealed disorders in adolescent girls, which is the basis for the prevention of inflammatory diseases of the genital organs, precancer, and cervical cancer [6].

It is necessary to remember the important role of leptin, which is one of the main factors for puberty and maintaining the body's ability to reproduce. Leptin is not only responsible for the feeling of satiety, but also signals a sufficient amount of energy required to start the process of puberty [18]. It has a direct and indirect effect through the control of the LH and FSH secretion on the sex hormones synthesis and regulates ovarian folliculogenesis. An excess of adipose tissue entails dysfunction of the ovaries and HMS (oligomenorrhea is diagnosed in 21.4% of women), and infertility is diagnosed with obesity 2 times more often than in the population. Anovulation and obesity constitute a vicious circle of pathogenesis: excess insulin binds to receptors in the ovaries, stimulates the synthesis of androgens, and increases the sensitivity of the ovaries to LH. Over time, androgens accumulate and inhibit the growth of the dominant follicle (anovulation). Hyperinsulinemia causes hyperandrogenism due to a decrease in the concentration of the hormone-binding sex steroid. There is a direct relationship: the overweight stimulates pronounced insulin resistance which causes a high risk of anovulation [9, 18].

A significant role in the development of menstrual function in adolescent girls is played a decrease in the level of melatonin and inhibin B. It was found that melatonin has a suppressive effect directly on the pituitary gland, reducing the release of LH and FSH. Insufficient secretion of melatonin by the pineal gland leads to increased production of FSH and, consequently, to the persistence of the follicle and absolute or relative hyperestrogenism. Abnormal changes in melatonin metabolism may have implications for circadian disorders since the suprachiasmatic nucleus is the area of the greatest accumulation of melatonin receptors. Inhibin B participates in the functioning of granulosa cells and belongs to the transforming growth factor β [31]. Inhibin B selectively inhibits the secretion of FSH, reduces the number of gonadotropin-releasing hormone receptors in the pituitary gland, and reflects the ovarian reserve of the ovaries, from prepubertal to postmenopausal period. Changes in inhibin B content can predict the onset of menarche with greater accuracy than an increase in LH and estradiol. An increase in the level of melatonin and a decrease in inhibin B potentiate the blocking of the central and peripheral

links in the regulation of the ovarian-menstrual cycle. They can act as markers of primary and secondary oligomenorrhea, as well as secondary amenorrhea. In addition, these indicators can be used to predict the recovery of the menstrual cycle in adolescents [2].

Equally important is the fact that the formation of menstrual function occurs against the background of physiological activation of the thyroid function. Any dysfunction of the thyroid gland (hypo- or hyperthyroidism) can lead to menstrual dysfunction, cause infertility and miscarriage. Girls with hypothyroidism have menstrual disorders, delayed sexual development, and amenorrhea. Experimental studies have shown the presence of receptors for thyroid stimulating hormone and T_3 in the ovary, which determines the possibility of a direct effect of thyroid dysfunction on steroidogenesis, ovulation, and corpus luteum function [26]. Thyroid hormones affect the function of the gonads, inhibiting FSH and increasing LH activity. They increase the sensitivity of the ovaries to gonadotropic hormones, the endometrium to estrogens [7, 28, 30, 38].

In the studies of V.O. Andreeva and A.A. Mashtalova that devoted to the role of apoptosis factors in the oligomenorrhea pathogenesis, was found that dysregulation of apoptosis is one of the important mechanisms of the early reproductive pathology formation and manifested by menstrual dysfunction in the puberty period of girls. Blocking of apoptosis in girls with oligomenorrhea occurs due to a systemic deficiency in the production of the key immunoregulatory and apoptosis-mediating cytokine tumor necrosis factor α (TNF- α), caspase-8, and overproduction of soluble forms of TNF- α receptors [3].

The clinical features of HMS, the presence of concomitant pathology in girls, a significant impact of risk factors, frequent disease recurrences, underestimation of this pathology by adolescents and their parents indicate the need for a consistent, individual, and integrated approach by choosing therapeutic measures that allow influencing not only individual clinical manifestations but also aimed at the timely correction of their reproductive and somatic health disorders.

It is known that regular menstruation in girls can recover only in 22% of them after 2–3 years without treatment, and in almost 60% of cases after treatment. The time of visiting a pediatric gynecologist is playing an important role: the treatment effectiveness in the 1st year of the HMS is 61.5%, after ≥ 2 years it decreases to 29%. A strong relationship between the parameters of the ovarian reserve and the hormonal background is established by the age of 17, therefore the main advantage in the treatment of menstrual cycle dysfunction in adolescent girls is given to non-hormonal methods (vitamins, phyto-, and physiotherapy) [32].

CONCLUSIONS

Girls with menstrual dysfunctions form a high-risk group for the occurrence of gynecological diseases in women of reproductive age, since many chronic diseases of adults are a prolonged pathology of adolescents [32].

It must be remembered that when prescribing etiotropic therapy and preventing possible complications, it is also necessary to take into account dysbiotic changes in the vaginal microbiota of girls.

Examination and treatment of puberty patients should be carried out by a specialist in child and adolescent gynecology, a pediatric endocrinologist, a pediatrician, and a family doctor since the methods used in adult gynecology are not always acceptable for girls [11, 23, 38].

Further monitoring of the dynamics of physical and sexual development of girls and women will make it possible to identify significant factors and priority areas related to the protection of women's reproductive health. At the same time, special

attention should be paid to social measures for the prevention and health promotion of girls. Prevention and treatment of gynecological diseases associated with hormonal imbalance should begin in puberty, and when they are carried out in the reproductive period, both age parameters and the peculiarities of the pathological process should be taken into account, largely due to the nature of the reproductive system disorders during puberty.

REFERENCES/ЛІТЕРАТУРА

- Adams Hillard, P.J. "Menstruation in young girls: a clinical perspective." *Obstet Gynecol* 99 (2002): 655–62.
- Андреева, В.О. Роль мелатонина и ингибина В в патогенезе олигоменореи у девочек-подростков / В.О. Андреева, Т.Л. Боташева, А.Н. Рымашевский [и др.] // Репродуктивное здоровье детей и подростков. – 2020. – № 16 (3). – С. 56–63. Андреева, В.О., Botasheva, T.L., Rymashevskiy, A.N., et al. "The role of melatonin and inhibin B in the pathogenesis of oligomenorrhea in adolescent girls." *Pediatric and Adolescent Reproductive Health* 16.3 (2020): 56–63.
- Андреева, В.О. Роль факторов апоптоза в патогенезе олигоменореи и маточных кровотечений пубертатного периода / В.О. Андреева, А.А. Машталова // Вестник СПбГУ. – 2011. – Сер. 11. Вып. 4. – С. 69–80. Андреева, В.О., Mashtalova, A.A. "The role of apoptosis factors in the pathogenesis of oligomenorrhea and uterine bleeding during puberty." *Bulletin of St Petersburg University* 11.4 (2011): 69–80.
- Бабенко-Скоропуд, И.В. Пути оптимизации охраны репродуктивного здоровья девочек-подростков с учетом данных Донецкого региона / И.В. Бабенко-Скоропуд, Э.Б. Яковлева, Е.П. Сорокопуд [и др.] // Репродуктивное здоровье детей и подростков. – 2019. – № 15 (4). – С. 17–24. Babenko-Skoropud, I.V., Yakovleva, E.B., Sorokopud, E.P., et al. "Ways to optimize the reproductive health of adolescent girls, taking into account the data of the Donetsk region." *Pediatric and Adolescent Reproductive Health* 15.4 (2019): 17–24.
- Багацька, Н.В. Обтяжений сімейний анамнез – фактор ризику формування порушень менструальної функції у дівчат-підлітків / Н.В. Багацька, І.Г. Деменкова, Т.А. Начотова // Вісник Харківського національного університету ім. В.Н. Каразіна. Серія «Біологія». – 2016. – № 27 (1). – С. 39–45. Bagatska, N.V., Demenkova, I.G., Nachotova, T.A. "Burdened family history – a risk factor for the formation of menstrual disorders in adolescent girls." *Bulletin of Karazin National University. Biology series* 27.1 (2016): 39–45.
- Бугун, О.В. Особенности состояния микробиоценоза влагалища и шейки матки у девушек-подростков с нарушениями менструального цикла / О.В. Бугун, Е.Е. Храмова, Л.Н. Пигарева [и др.] (II Научно-практическая конференция с международным участием «Национальный и международный опыт охраны репродуктивного здоровья детей и подростков») // Репродуктивное здоровье детей и подростков. – 2016. – № 2. – С. 58–59. Bugun, O.V., Khranova, E.E., Pigareva, L.N., et al. "Features of the state of the vagina and cervix microbiocenosis in adolescent girls with menstrual irregularities." (II Scientific-practical conference with international participation "National and international experience in protecting the reproductive health of children and adolescents"). *Pediatric and Adolescent Reproductive Health* 2 (2016): 58–9.
- Цисар, Ю.В. Особливості перебігу пубертатного періоду у дівчат із порушеннями менструальної функції / Ю.В. Цисар // Буковинський медичний вісник. – 2018. – № 22 (2). – С. 109–112. Tysar, Y.V. "Peculiarities of puberty in girls with menstrual dysfunction." *Bukovinian Medical Herald* 22.2 (2018): 109–12.
- Comin, F.V., Wippel, C.S., Copès, R.M., et al. "Higher prevalence of clinical cardiovascular comorbidities in postmenopausal women with self-reported premenopausal hirsutism and/or oligo-amenorrhea." *Dermatoendocrinol* 9.1 (2017): e1356517.
- Дворянский, С.А. Ожирение и женское репродуктивное здоровье / С.А. Дворянский, Д.И. Емельянова // Вятский медицинский вестник. – 2020. – № 2 (66). – С. 83–87. Dvoryansky, S.A., Emelyanova, D.I. "Obesity and Women's Reproductive Health." *Vyatka Medical Bulletin* 2.66 (2020): 83–7.
- Geum, J.C., Sung, W.H., Jung-Ho, S., Tak, K. "Effects of intensive training on menstrual function and certain serum hormones and peptides related to the female reproductive system." *Medicine (Baltimore)* 96.21 (2017): 6876.
- Горбунова, О.В. Порівняльний аналіз сучасних підходів до корекції гіперпролактинемії у дівчат-підлітків із порушеннями менструальної функції / О.В. Горбунова, І.О. Юрченко // Репродуктивна ендокринологія. – 2020. – № 5. – С. 42–47. Gorbonova, O.V., Yurchenko, I.O. "A predictive analysis of daily progress to the correction of hyperprolactinemia in children with impaired menstrual functions." *Reproductive Endocrinology* 5 (2020): 42–7.
- Говоруха, И.Т. Юное материнство и его последствия / И.Т. Говоруха, А.А. Железная, Э.Б. Яковлева // Материалы XIX Всероссийского научно-образовательного форума «Мать и дитя-2018». – 2018. – С. 13. Govorukha, I.T., Zheleznyaya, A.A., Yakovleva, E.B. "Young motherhood and its consequences." *Materials of the XIX All-Russian Scientific and Educational Forum "Mother and Child-2018"* (2018): 13.
- Грищенко, О.В. Новые паттерны лечения нарушений менструального цикла – унификация метода / О.В. Грищенко, В.В. Бобрыцкая // Репродуктивна ендокринологія. – 2019. – № 3 (47). – С. 26–32. Gryshchenko, O.V., Bobrytska, V.V. "New patterns of menstrual disorder's treatment – unification of the method." *Reproductive Endocrinology* 3.47 (2019): 26–32.
- Гуркин, Ю.А. Концепция «перинатального следа в детской гинекологии» // Буковинський медичний вісник. – 2001. – № 2. – С. 56–57. Gurkin, Y.A. "The concept of "perinatal trace" in pediatric gynecology." *Bukovinian Medical Herald* 2 (2001): 56–7.
- Hickey, R.J., Zhou, X., Settles, M.L., et al. "Vaginal microbiota of adolescent girls prior to the onset of menarche resemble those of reproductive-age women." *mBio* 6.2 (2015): 00097–15.
- Iacovides, S., Avidon, I., Baker, F.C. "What we know about primary dysmenorrhea today: a critical review. Review article." *Hum Reprod Update* 21.6 (2015): 762–78.
- Kalsi, A.K., Halder, A., Jain, M. "Prevalence and reproductive manifestations of macroprolactinemia." *Endocrine* 63 (2019): 332–40.
- Кашкалда, Д.А. Уровень лептина и особенности липидного спектра крови у девочек-подростков с олигоменореей и вторичной аменореей / Д.А. Кашкалда, С.А. Левенец, Т.А. Начотова, Т.М. Кулинич // Репродуктивна ендокринологія. – 2012. – № 3 (5). – С. 32–35. Kaskhald, D.A., Levenets, S.A., Nachotova, T.A., Kulnich, T.M. "The level of leptin and features of the lipid spectrum of blood in adolescent girls with oligomenorrhea and secondary amenorrhea." *Reproductive Endocrinology* 3.5 (2012): 32–5.
- Колесник, М. Гипоменструальный синдром у девочек-подростков: патогенез, профилактика, отдаленные последствия / М. Колесник // Укр. мед. часопис. – 2017. – № 3. – С. 16–19. Kolesnik, M. "HMS in adolescent girls: pathogenesis, prevention, long-term consequences." *Ukrainian medical journal* 3 (2017): 16–9.
- Кузнецова, И.В. Использование растительных дофаминимитетиков у подростков и молодых женщин с нарушенным менструальным циклом / И.В. Кузнецова, Ю.Б. Успенская, В.В. Диль, А.М. Гринева // Акушерство и гинекология. – 2015. – № 10. – С. 52–58. Kuznetsova, I.V., Uspenskaya, Y.B., Dil, V.V., Grineva, A.M. "Use of herbal dopaminomimetics in adolescents and young women with irregular menstrual cycles." *Obstetrics and gynecology* 10 (2015): 52–8.
- Левенець, С.О. Функція репродуктивної системи в матерів дівчат із гіпоменструальним синдромом / С.О. Левенець, Т.А. Начотова, О.Г. Верхошанова [та ін.] // Акушерство. Гінекологія. Генетика. – 2017. – № 3 (3). – С. 53–55. Levenets, S.A., Nachotova, T.A., Verkhoshanova, O.G., et al. "Reproductive function of mothers of girls with HMS." *Obstetrics. Gynecology. Genetics* 3.3 (2017): 53–5.
- Левенець, С.А. Клинические особенности девочек-подростков с гипоменструальным синдромом на фоне дефицита массы тела / С.А. Левенец, Н.А. Удовикова. Дополнение к материалам III Научно-практической конференции с международным участием «Национальный и международный опыт охраны репродуктивного здоровья детей и молодежи» (16–18 апреля 2019 г., Москва) // Репродуктивное здоровье детей и подростков. – 2019. – Т. 15. № 4. Levenets, S.A., Udovikova, N.A. "Clinical features of adolescent girls with HMS associated with underweight. Supplement to the materials of the III Scientific-practical conference with international participation "National and international experience in protecting the reproductive health of children and youth" (April 16–18, 2019, Moscow)." *Pediatric and Adolescent Reproductive Health* 15.4 (2019).
- Левенець, С.О. Профілактика олігоменореї та вторинної аменореї в дівчат-підлітків / С.О. Левенець, Т.А. Начотова, Н.О. Удовикова, С.В. Новохатська // Український журнал дитячої ендокринології. – 2017. – № 2. – С. 29–33. Levenets, S.O., Nachotova, T.A., Udovikova, N.O., Novokhatskaya, S.V. "Prevention of oligomenorrhea and secondary amenorrhea in adolescent girls." *Ukrainian Journal of Pediatric Endocrinology* 2 (2017): 29–33.
- Мазур, Л.П. Клінічний випадок гіперпролактинемії, поєднаної із підвищенням тиреотропного гормону / Л.П. Мазур, М.І. Марущак, Л.В. Наумова // Вісник медичних і біологічних досліджень. – 2019. – № 2. – С. 87–89. Mazur, L.P., Marushchak, M.I., Naumova, L.V. "A clinical case of hyperprolactinemia combined with an increase in thyroid-stimulating hormone." *Bulletin of medical and biological research* 2 (2019): 87–9.
- Начотова, Т.А. Психологічні особливості девочек-подростков с олигоменореей и вторичной аменореей и их зависимость от уровня стресс-реализующих гормонов / Т.А. Начотова, Е.Э. Беляева, Н.А. Удовикова, Д.А. Кашкалда // Міжнародний журнал педіатрії, акушерства та гінекології. – 2018. – № 12 (1). – С. 59–63. Nachotova, T.A. "Psychological features of adolescent girls with oligomenorrhea and secondary amenorrhea and their dependence on the level of stress-realizing hormones." *International journal of pediatrics, obstetrics and gynecology* 12 (1) (2018): 59–63.

Nachotova, T.A., Belyaeva, E.E., Udovikova, N.A., Kashkald, D.A. "Psychological features of adolescent girls with oligomenorrhea and secondary amenorrhea and their dependence on levels of stress-releasing hormones." *International Journal of Pediatrics, Obstetrics and Gynecology* 12.1 (2018): 59–63.

26. Начотова, Т.А. Вторинна аменорея у дівчат-підлітків (клінічні і гормонально-метаболічні аспекти, патогенез, діагностика та лікування) [Текст]: дис. ... д-ра мед. наук / Т. А. Начотова. — Харків, 2016. — 320 с.

Nachotova, T.A. "Secondary amenorrhea in adolescent girls (clinical and hormonal-metabolic aspects, pathogenesis, diagnosis and treatment)": Thesis for the doctor degree of medical sciences. Kharkiv (2016): 320 p.

27. Orio, F. "Effects of physical exercise on the female reproductive system." *Minevra Endocrinol* 38.3 (2013): 305–19.

28. Паньків, В.І. Вплив дисфункції щитоподібної залози на репродуктивну систему жінки. Сучасні можливості фітотерапії / В.І. Паньків // Репродуктивна ендокринологія. — 2016. — № 1 (27). — С. 52–57.

Pankiv, V.I. "The influence of thyroid disorders upon the female reproductive function. Modern possibilities of phytotherapy." *Reproductive Endocrinology* 1.27 (2016): 52–7. DOI: 10.18370/2309-4117.2016.27

29. Seidenfeld, M.E., Rickert, V.I. "Impact of anorexia, bulimia and obesity on the gynecologic health of adolescents." *Am Fam Physician* 64.3 (2001): 445–50.

30. Tatarchuk, T., Zakharenko, N., Bachynska, I., Kosey, N. "On the issue of autoimmune ovary damage during puberty." *Georgian Med News* 279 (2018): 49–56.

31. Tencer, J., Lemaire, P., Brailly-Tabard, S., Brauner, R. "Serum Inhibin B Concentration as a Predictor of Age at First

Menstruation in Girls With Idiopathic Central Precocious Puberty." *PLoS One* 13.12 (2018): 2058.

32. Удовикова, Н.А. Особенности терапии девочек-подростков с первичной олигоменореей / Н.А. Удовикова // Акушерство. Гинекология. Генетика. — 2017. — № 3 (3). — С. 59–62.

Udovikova, N.A. "Features of therapy of adolescent girls with primary oligomenorrhea." *Obstetrics. Gynecology. Genetics* 3.3 (2017): 59–62.

33. Uvarova, E.V., Batoryrova, Z.K., Latypova, N.K. "Features of microbiocenosis of the mucous membrane of the vagina in girls with vulvovaginitis when using molecular genetic diagnostic methods." *Pediatric and Adolescent Reproductive Health* 4 (2014): 42–8.

34. Уварова, Е.В. Возрастные особенности диагностики и лечения бактериального вагиноза в детском и подростковом возрасте / Е.В. Уварова, Н.Х. Латыпова, Н.А. Муравьева [и др.] // Рос. вестн. акуш.-гин. — 2006. — № 4. — С. 57–61.

Uvarova, E.V., Latypova, N.K., Muravyova, N.A., et al. "Age features of the diagnosis and treatment of bacterial vaginosis in childhood and adolescence." *Russian Bulletin of Obstetrician-Gynecologist* 4 (2006): 57–61.

35. Уварова, Е.В. Влагалище как микроэкоцистема в норме и при воспалительных процессах различной этиологии / Е.В. Уварова, Ф.Ш. Султанова, Н.Х. Латыпова // Репродуктивное здоровье детей и подростков. — 2005. — № 2. — С. 26–38.

Uvarova, E.V., Sultanova, F.S., Latypova, N.K. "The vagina as a microecosystem in normal conditions and in inflammatory processes of various etiologies." *Pediatric and Adolescent Reproductive Health* 2 (2005): 26–38.

36. Vale, B., Brito, S., Paulos, L., Moleiro, P. "Menstruation disorders in adolescents with eating disorders-target body mass index percentiles for their resolution." *Einstein (Sao Paulo, Brazil)* 12.2 (2014): 175–80.

37. Voropaeva, N.M., Nemchenko, U.M., Grigороva, E.V., et al. "Microecological features of the vaginal biotope in teenage girls with menstrual disorders." *Pediatric and Adolescent Reproductive Health* 1 (2018): 37–44.

38. Вовк, І.Б. Нормалізація порушень менструальної функції у дівчат-підлітків – запорука збереження репродуктивного здоров'я у жінок / І.Б. Вовк, А.Г. Корнацька, В.Ф. Петербурзька // Здоров'я України. — 2019. — № 2. — С. 27–35.

Vovk, I.B., Kornatska, A.G., Petersburzka, V.F. "Normalization of menstrual disorders in adolescent girls is the key to maintaining reproductive health in women." *Health of Ukraine* 2 (2019): 27–35.

39. World Health Organization. *International Statistical Classification of Diseases and Related Health Problems of the Tenth Revision (ICD-10)*. Geneva. May 23, 2019.

40. Яковлева, Э.Б. Особенности овариального резерва у девочек-подростков на фоне периода интенсивного роста со вторичной аменореей / Э.Б. Яковлева, И.В. Бабенко-Сорокопуд, Л.В. Желтоноженко, В.В. Вустенко // Мед.-соц. пробл. семьи. — 2018. — № 23 (1). — С. 35–40.

Yakovleva, E.B., Babenko-Sorokopud, I.V., Zheltonozhenko, L.V., Vustenko, V.V. "Features of ovarian reserve in adolescent girls against the background of a period of intensive growth with secondary amenorrhea." *Medical and Social Problems of Family* 23.1 (2018): 35–40.

HYPOMENSTRUAL SYNDROME IN ADOLESCENT GIRLS AS A RESULT OF REPRODUCTIVE DYSFUNCTION IN THEIR MOTHERS

Literature review

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In recent years in Ukraine and in the world there has been a clear tendency towards deterioration in the indicators of the somatic health of children and adolescents, that is negatively affects the processes of reproductive health formation and it state in the future.

Concern for adolescent girl's health, including their reproductive system, forms an enormous contribution to the society future. That's why big attention is paid to the formation and saving reproductive health of adolescent girls. The period of sexual development is defining in a woman's life and is considered a key moment on the path of reproductive maturity. Today it has been established that the reproductive health formation is influenced by environmental, socio-economic factors and the presence of somatic diseases. Despite the fact that the pathogenetic mechanisms of the reproductive system formation are extremely complex and sensitive to the effects of negative factors, the appearance of destructive factors at this time can disrupt the physiological chain of functioning of the hormonal mechanisms which regulate the reproductive system. Disorders of the menstrual cycle is one of the most common pathological conditions, combining pathogenetically different diseases, which are manifested by a violation of the menstrual duration and frequency, amount of menstrual flow. According to domestic literature, hypomenstrual syndrome (oligomenorrhea, amenorrhea) is in the first place among menstrual dysfunctions in adolescent girls in the structure of gynecological morbidity and is up to 45%. Menstrual irregularities that occur during adolescence often persist into the future, causing infertility, obstetric pathology, perinatal loss and other reproductive health problems during childbearing years. The problem of the menstrual cycle formation has been little studied, but it is socially significant, very relevant and requires further study.

Thus, girls with menstrual disorders constitute a group of increased risk of gynecological diseases in women of reproductive age, since many chronic diseases of adults are a protracted pathology of adolescents. Therefore, adolescent girls should be examined and treated by a specialist in pediatric and adolescent gynecology, pediatric endocrinologist, pediatrician and family doctor.

Keywords: menstrual disorders, reproductive dysfunction, hypomenstrual syndrome, oligomenorrhea, amenorrhea, adolescent girls.

ГІПОМЕНСТРУАЛЬНИЙ СИНДРОМ У ДІВЧАТОК-ПІДЛІТКІВ ЯК НАСЛІДОК ПОРУШЕННЯ РЕПРОДУКТИВНОЇ ФУНКЦІЇ ЇХНІХ МАТЕРЕЙ

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Останніми роками в Україні та світі спостерігається чітка тенденція до погіршення показників соматичного здоров'я дітей і підлітків, що негативно впливає на процеси формування та стан репродуктивного здоров'я в майбутньому. Турбота про здоров'я дівчат-підлітків, включено з їхньою репродуктивною системою, робить вагомий внесок у майбутнє суспільства. Тому слід приділяти велику увагу формуванню та збереженню репродуктивного здоров'я дівчат-підлітків. Період статевого розвитку є визначальним у житті жінки і уважається ключовим на шляху становлення репродуктивної зрілості. Сьогодні встановлено, що на формування репродуктивного здоров'я впливають екологічні, соціально-економічні чинники та наявність соматичних захворювань. Зважаючи на те що патогенетичні механізми формування репродуктивної системи є надзвичайно складними й чутливими до негативних впливів, поява деструктивних чинників у цей час може порушити фізіологічний ланцюг функціонування гормональних механізмів регуляції репродуктивної системи. Порушення менструального циклу є одним із найпоширеніших патологічних станів, що поєднує в собі патогенетично різні захворювання, які проявляються порушенням тривалості та частоти менструацій, обсягу менструальних виділень. Згідно з даними вітчизняної літератури, гіпоменструальний синдром (олігоменорея, аменорея) посідає перше місце серед менструальних порушень у дівчаток-підлітків у структурі гінекологічної захворюваності – до 45%. Порушення менструального циклу, що виникли в підлітковому періоді, часто зберігаються в майбутньому, спричиняючи безпліддя, акушерську патологію, перинатальні втрати та інші розлади репродуктивного здоров'я в дитинстві. Проблема формування менструального циклу мало вивчена, але соціально значуща, дуже актуальна й потребує подальшого вивчення.

Отже, дівчатка-підлітки з порушенням менструального циклу становлять групу підвищеного ризику розвитку гінекологічних хвороб у жінок репродуктивного віку, оскільки багато хронічних захворювань дорослих є результатом затяжної патології підлітків. Тому слід проводити обстеження та лікування дівчаток-підлітків фахівцем дитячої та підліткової гінекології, дитячим ендокринологом, педіатром і сімейним лікарем.

Ключові слова: порушення менструального циклу, репродуктивна дисфункція, гіпоменструальний синдром, олігоменорея, аменорея, дівчатка-підлітки.

ГІПОМЕНСТРУАЛЬНИЙ СИНДРОМ У ДЕВОЧЕК-ПОДРОСТКОВ КАК СЛЕДСТВИЕ НАРУШЕНИЯ РЕПРОДУКТИВНОЙ ФУНКЦИИ ИХ МАТЕРЕЙ

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В последние годы в Украине и мире намечается четкая тенденция к ухудшению показателей соматического здоровья детей и подростков, что негативно сказывается на процессах формирования и состоянии репродуктивного здоровья в будущем. Забота о здоровье девочек-подростков, включая их репродуктивную систему, вносит огромный вклад в будущее общества. Поэтому большое внимание следует уделять формированию и сохранению репродуктивного здоровья девочек-подростков.

Период полового развития является определяющим в жизни женщины и считается ключевым на пути становления репродуктивной зрелости. Сегодня установлено, что на формирование репродуктивного здоровья влияют экологические, социально-экономические факторы и наличие соматических заболеваний. Ввиду того что патогенетические механизмы формирования репродуктивной системы чрезвычайно сложны и чувствительны к негативным воздействиям, появление деструктивных факторов в это время может нарушить физиологическую цепочку функционирования гормональных механизмов регуляции репродуктивной системы. Нарушение менструального цикла – одно из наиболее частых патологических состояний, сочетающее патогенетически разные заболевания, которые проявляются нарушением продолжительности и частоты менструаций, объема менструальных выделений. По данным отечественной литературы, гипоменструальный синдром (олигоменорея, аменорея) занимает первое место среди нарушений менструального цикла у девочек-подростков в структуре гинекологической заболеваемости – до 45%. Нарушения менструального цикла, возникшие в подростковом периоде, часто сохраняются в будущем, вызывая бесплодие, акушерскую патологию, перинатальные потери и другие нарушения репродуктивного здоровья в детородном возрасте. Проблема формирования менструального цикла мало изучена, но социально значима, очень актуальна и требует дальнейшего изучения.

Таким образом, девушки с нарушением менструального цикла составляют группу повышенного риска развития гинекологических болезней у женщин репродуктивного возраста, поскольку многие хронические заболевания взрослых являются результатом затяжной патологии подростков. Поэтому следует проводить обследование и лечение девочек-подростков специалистом детской и подростковой гинекологии, детским эндокринологом, педиатром и семейным врачом.

Ключевые слова: нарушение менструального цикла, репродуктивная дисфункция, гипоменструальный синдром, олигоменорея, аменорея, девочки-подростки.