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NORMAL MENSTRUAL CYCLE AND ITS REGULATION

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Abstract: The article presents data on the regulation of the function of the female reproductive system and the mechanisms of coordination of the main links of the functional system. The menstrual cycle is one of the significant manifestations of the condition of the organs that regulate sexual function. In the occurrence of functional changes in the cycle, along with biological factors, the role of environmental influences has been identified.

Key words: female reproductive system, menstrual function, regulation, menstrual cycle, cycle disorders.

Relevance of the topic: The female reproductive system is responsible for performing many specific functions of women, but primarily reproductive ones. It is carried out thanks to the activity of the ovaries and uterus, that is, the peripheral parts of the reproductive system and is regulated by central mechanisms. The interaction of these systems is ensured by neurohumoral regulation. In accordance with their hierarchy (from higher regulatory structures to directly executive organs), neuroendocrine regulation is divided into 5 levels that interact according to the principle of direct and inverse positive and negative relationships.

The purpose of the study is to study, analyze menstrual irregularities and prevent the detection and prevention of menstrual irregularities.

To achieve the goal of this work, the following tasks are formulated and set:

- study of the theoretical cycle, as well as methods of prevention;
- develop methods for the prevention of menstrual disorders in women.

Main part.

"The menstrual cycle (from the Latin menstruus - monthly) is cyclical changes in a woman's body, mainly in the parts of the reproductive system, repeating at certain intervals and manifested by regular uterine bleeding - menstruation (menses)"[1].

The normal menstrual cycle is the result of neurohormonal relationships between the central nervous system, hypothalamus, pituitary gland, ovaries and uterus. A regular menstrual cycle is established within a year after the first menstruation (menarche) and persists until 45–52 years of age.

The first day of menstruation is conventionally accepted as the beginning of a new menstrual cycle. The duration of the menstrual cycle is calculated as the interval between the first days of the next two menstruation periods.

[1] Shestakova I.G., Simonovskaya H.Yu. Menstrual irregularities at a young age: new goals - proven means [Text] // I.G. Shestakova, Kh.Yu. Simonovskaya; edited by V.E. Radzinsky. - M.: Editorial office of the magazine StatusPraesens, 2016 - P.50.

Normally, menstruation should be painless.

Phases of the ovarian cycle:

- *follicular phase.* Lasts from 1 to 14 days of the menstrual cycle. During this period, the follicle grows and develops from primordial to mature (graphic vesicle). This process occurs under the influence of the pituitary follicle stimulating hormone (FSH). During this phase, estrogens are produced in the ovaries;
- *ovulation.* It occurs in the middle of the menstrual cycle (approximately day 14). Ovulation is the rupture of a mature follicle and the release of a mature egg from its cavity, ready for fertilization;
- *luteal phase.* Occurs after ovulation and until the end of the menstrual cycle. In the ovary, under the influence of luteinizing hormone (LH), a corpus luteum is formed at the site of the burst follicle, which begins to produce the hormone progesterone[2].

Phases of the uterine cycle:

- *menstruation (desquamation).* Lasts from 1 to 5 days of the menstrual cycle - this is the rejection of the endometrial layer. Under the influence of enzymes, the functional layer disintegrates, is torn away and is released outward in a place with the contents of the uterine glands and blood from the opened vessels;
- *regeneration.* Lasts from day 1 to day 7 of the menstrual cycle. Due to the proliferation of the epithelium, the functional layer is restored;
- *proliferation.* Lasts from 7 to 14 days of the menstrual cycle. Angiogenesis (growth of blood vessels), growth of uterine glands. Proliferation of cells in the basal layer. New epithelial lining;
- *secretory.* Occurs from the middle of the cycle to the end of the cycle. In the uterus, glycogen increases, vascularization increases, and the glandular structure of the uterine mucosa takes on a mature form. If pregnancy does not occur, the functions of the corpus luteum and progesterone levels are significantly reduced. The endometrium loses its hormonal support and is ready to shed. And a new menstrual cycle begins.

Estrogen and progesterone levels are low towards the end of the menstrual cycle, causing cyclic changes in the hypothalamic and pituitary structures. What causes a new menstrual cycle.

Hypothalamic cells combine information received from different parts of the central nervous system. The cells of the hypothalamus are intermediaries for the pituitary gland. They are secreted in a pulsatile manner and transported to the anterior pituitary gland through the hypothalamic-pituitary vessels. The pituitary gland produces gonadotropic hormones that stimulate the growth, development and endocrine function of the follicles and corpus luteum. Under the influence of hormones, the proliferation phase occurs, and the hormone of the corpus luteum causes secretory transformation of the uterine mucosa.

Action of ovarian hormones.

Estrogens:

- development of a woman's secondary sexual characteristics during puberty, including mammary gland and milk duct lobules, body hair and fat;
- activation of proliferation of the epithelium of the reproductive system, including regeneration and growth of the endometrium in the first phase of the menstrual cycle;

[2] Fanchenko, N.D., G.A. Anashkina, I.G. Torganova. On the hormonal regulation of the menstrual cycle [Text] // Obstetrics and gynecology, 2011. No. 5 P.21.

- stimulation of the secretion of low-viscosity cervical mucus, which facilitates the penetration of sperm during ovulation;
- hypertrophy and increased contractile activity of the smooth muscles of the genital tract;
- approach of the fallopian tube villi to the ovulating follicle. What promotes egg transfer;
- increased libido in the middle of the cycle.

Actions of progesterone:

Progesterone is produced in significant quantities only during certain periods of the menstrual cycle. It is synthesized by the corpus luteum and placenta during pregnancy. Progesterone is a pregnancy hormone and its main function is to prepare the reproductive tract. This happens as follows:

- transformation of the proliferating endometrium into a secretory one;
- secretion of thick, viscous cervical mucus, which makes it difficult for sperm and bacteria to penetrate;
- the formation of a full-fledged secretion phase promotes implantation and prolongation of pregnancy through various mechanisms, including blockade of uterine contractile activity;
- increase in basal temperature in the second phase of the cycle;
- stimulation of mammary gland growth.

Considering the modern classification, the main disorders, the frequency of the menstrual cycle, the intensity and time of occurrence of bleeding, can be defined in the following terms:

Irregularities in the duration of the menstrual cycle:

- amenorrhea - absence of menstruation for more than 6 months.
- oligomenorrhea - the duration of the menstrual cycle is more than 42 days.
- polymenorrhea - cycle duration is less than 21 days.

Pathology of menstrual bleeding:

- abnormal uterine bleeding is any uterine bleeding during reproductive age that does not meet the parameters of normal menstruation.
- dysmenorrhea is a cyclically recurring pain syndrome that accompanies menstruation.

“Amenorrhea is the absence of menstruation for 6 months or more”[3]. Amenorrhea is not an independent disease, but a symptom of neuroendocrine diseases, pathologies of various levels of the reproductive system, benign and malignant neoplasms.

“The frequency of amenorrhea among women of reproductive age is approximately 1.8–3.5%, among students 3.5–5%, and in the structure of disorders of generative and menstrual function 10–15%. Primary amenorrhea makes up about 10% of the structure of amenorrhea and is much less common than secondary”[4].

[3] Bulanov, M. N. Ultrasound gynecology [Text] // course of lectures. Part 2 Chapters 14-24 / M. N. Bulanov. - 2nd edition, revision and addition - Moscow: Vidar, 2012 – P.456.
[4] Speranskaya N.V., N.D. Fanchenko. Modern ideas about neuroendocrine control of the menstrual cycle [Text] // Obstetrics and gynecology. 2011 N 5 - P. 26.

Classification:

Depending on the level at which disturbances in the regulation of menstrual function occur, various forms of amenorrhea are distinguished. Amenorrhea is divided into false and true.

"False amenorrhea is a condition in which the release of menstrual blood does not occur, but the cyclic processes in the hypothalamus-pituitary-ovaries-uterus system proceed normally". The causes of false amenorrhea are most often fusion (atresia) of the hymen, cervical canal, vagina, or malformations of the genitals. Menstrual blood accumulates in the vagina with the formation of hematocolpos, when it accumulates in the uterus - hematometra, and if in the fallopian tubes - hematosalpinx. Also, menstrual blood can enter the abdominal cavity through the fallopian tubes and simulate the clinic of an "acute abdomen". Treatment of false amenorrhea is only surgical - dissection of the hymen, dilation of the vagina and cervical canal.

True amenorrhea is a condition in which the absence of menstruation is clinically accompanied, but changes do not occur in the hypothalamus-pituitary-ovary-uterus system. True amenorrhea can be pathological and physiological. True physiological amenorrhea is observed in the following conditions:

- in girls before puberty;
- during pregnancy;
- during lactation;
- during the postmenopausal period.

And it should also be noted that there is true pathological amenorrhea, it is divided into primary and secondary. Primary amenorrhea - the first menstruation is absent after 16 years. Secondary amenorrhea is when menstruation is absent for 6 months or more in previously menstruating women.

True pathological amenorrhea, according to the etiological factor, is divided into amenorrhea due to extragonadal causes and amenorrhea due to dysfunction of the gonads.

Oligomenorrhea is a condition in which menstruation occurs less than once every 40 days. In some cases, bleeding occurs only once every six months. Oligomenorrhea occurs either in young women or in premenopausal women. Only 2-3% of women suffer from this pathology.

The most important symptom of oligomenorrhea is rare menstruation. Often this disease is accompanied by acne on the face in women, as well as on the chest and back, excess weight, and hirsutism (increased hair growth). Many women suffering from oligomenorrhea have decreased libido (sex drive). Often such women resemble men in figure.

"Polymenorrhea is menstrual bleeding that recurs cyclically at short intervals of no more than 21 days"[5].

Abnormal uterine bleeding:

"Abnormal uterine bleeding (AUB) is any uterine bleeding that does not meet the parameters of normal menstruation during reproductive age (pregnancy and cervical pathology are excluded)". Abnormal uterine bleeding is excessive in duration, volume of blood loss and frequency of bleeding that occurs in women outside of pregnancy. The frequency of abnormal uterine bleeding in the general structure of gynecological diseases: in adolescence - 10%, in the active reproductive period - 25–30%, in late reproductive age - 35–55%, in perimenopause - 55–60%. Abnormal uterine bleeding ranks second among the reasons for hospitalization of women in gynecological hospitals and is the most common indication for hysterectomies

[5] Smetnik, V. P. Genitourinary menopausal syndrome: a new term, rationale and discussion [Text] // V. P. Smetnik // Obstetrics and gynecology. - 2016 - No. 4 - P.30.

and endometrial ablations. Abnormal uterine bleeding leads to a decrease in the quality of life of women (physical, emotional, financial state), high cost of treatment and economic consequences associated with temporary disability.

In the new nomenclature, abnormal uterine bleeding should be distinguished as chronic and acute bleeding. Chronic bleeding is uterine bleeding observed for 6 months or more, regularity and (or) frequency, abnormal in volume, which does not require immediate medical intervention. "Acute bleeding is excessive bleeding that requires urgent intervention to prevent further blood loss"[6].

Acute abnormal uterine bleeding may occur against the background of pre-existing chronic abnormal uterine bleeding or for the first time. Abnormal uterine bleeding can have different origins, occurring outside of pregnancy, which further determines management tactics.

"Dysmenorrhea is a pain syndrome that repeats cyclically and is caused by a complex of neurovegetative, metabolic and behavioral disorders that accompany menstruation"[7]. The incidence of dysmenorrhea among different age categories of menstruating women ranges from 8 to 92% and is observed at the age of 13–44 years.

An important medical aspect of dysmenorrhea is that chronic pain syndrome contributes to the formation of personality anomalies - both from mild neurotic conditions and to severe psycho-like syndromes. The social nature of the problem of dysmenorrhea is due to its wide distribution and frequent decrease in working capacity.

Risk factors for the development of dysmenorrhea include:

- early age of menarche;
- long menstruation;
- smoking (active, passive);
- family history;
- physical inactivity;
- frequent stressful situations in the family;
- frequent changes in life;
- low socio-economic status.

The following forms of dysmenorrhea are distinguished:

- "Primary dysmenorrhea is a cyclical pathological process that occurs from the moment of the first menstruation or 1.5–2 years after the establishment of ovulatory cycles. Not associated with pathological changes in the internal genital organs, most often of a functional nature"[8];
- "Secondary dysmenorrhea is organic in nature, caused by gynecological diseases: external and internal genital endometriosis, inflammatory diseases and tumors of the uterus and its appendages,

[6] Pestrikova, T. Yu. Drug therapy in the practice of an obstetrician-gynecologist [Text] // manual / T. Yu. Pestrikova, E. A. Yurasova, I. V. Yurasov. - Moscow: Litterra, 2011 – P.512.
[7] Smetnik, V. P. Genitourinary menopausal syndrome: a new term, rationale and discussion [Text] // V. P. Smetnik // Obstetrics and gynecology. - 2016 - No. 4 - P.30.
[8] Mazza D. reference book on gynecology [Text] // D. Mazza; translation from English. Edited by G.T. Sukhikh, I.A. Apolokhina. – M.: Practical Medicine, 2017 – P.568.

malformations of the uterus and vagina, adhesions in the pelvis, varicose veins of the pelvis"[9]. It is observed more often in women after 30 years.

In its course, dysmenorrhea can be decompensated, when there is an increase in the intensity of pain during menstruation over time, and compensated, in which the severity of pathological symptoms does not change over time.

A menstrual disorder is considered a cycle whose duration increases by more than a week. Also, if the period between menstruation is reduced by 5-7 days, and this is repeated systematically, in this case we can confidently talk about a malfunction of menstrual function. With the exception of women who have a longer or shorter cycle genetically, in everyone else it is defined as a disorder and requires urgent evaluation.

Conclusion:

The main reason for the disruption of the menstrual cycle is hormonal imbalance. This happens in various diseases and conditions. It should also be noted that the hereditary factor plays an important role - if ancestors on the female line had disruptions in the cycle or other disorders, it is quite possible that this will affect the nature of menstruation in women in subsequent generations.

Since the regulation of the menstrual cycle involves the brain and organs of the endocrine system, very often the problem arises due to disruptions in interaction.

Irregularities in the menstrual cycle can be a symptom of dangerous diseases, including cancer.

So, cycle disorders should not be ignored, since the woman already has indicators of health problems and they can lead to very serious diseases. Self-diagnosis here is elementary - it is only important to notice any existing symptoms in time and immediately contact a qualified specialist.

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