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The Overview of Menstrual Physiology: A Narrative Literature Review

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A B S T R A C T

Menstruation is a physiological or normal condition, namely events of the production of blood, mucus, and cell waste periodically originate from the uterine mucosa and occur relatively regularly from menarche until menopause, except during pregnancy and lactation. Menstruation is the result of very neat and standard cooperation from the hypothalamus-pituitary-ovarian endocrine axis. Hypothalamus spurs the pituitary gland by secreting gonadotropin-releasing hormone (GnRH), a deca-peptide secreted pulsatively by the hypothalamus. Menstruation is considered normal if it occurs between 22-35 days. Disturbance menstruation is most common at the beginning and end of the reproductive period, namely in those under 19 years of age and over 39 years of age. These disturbances may be related to the length of the menstrual cycle or the number and duration of menstruation. One person Women can experience both disorders. This literature review aimed to describe the menstrual cycle physiologically and the disorders that accompany it.

1. Introduction

Menstruation is a physiological or normal condition, namely events of the production of blood, mucus, and cell waste periodically originate from the uterine mucosa and occur relatively regularly from menarche until menopause, except during pregnancy and lactation.[1] Bleeding duration on menstruation varies, generally 4-6 days, but 2-9 days are still considered physiological. Menstruation is caused by reduced estrogen and progesterone suddenly, especially progesterone, at the end of the monthly ovarian cycle. With the mechanism posed by the two hormones above against cells' endometrial lining, the necrotic endometrial lining can be removed accompanied by normal bleeding.

During the menstrual cycle, the levels of the hormones estrogen and progesterone increase produced by the ovary changes. The first part of the menstrual cycle produced by the ovaries is part of the estrogen. This estrogen will cause the growth of a thick layer of blood and tissue around the endometrial. In the middle of the cycle, the ovary releases an egg which is called ovulation. In the second part of the menstrual cycle, which is between the middle and the next menstruation comes, a woman's body produces the hormones progesterone and prepares the uterus for pregnancy. The menstrual cycle is divided into the ovarian cycle and the endometrial cycle. There are three phases in the ovary, namely the follicular phase, the ovulation phase, and the luteal phase. The endometrium is also divided into three phases consisting of the menstrual phase, proliferative and excretory phases.[2-4] This literature review aimed to describe the menstrual cycle physiologically and the disorders that accompany it.

Hormones that control the menstrual cycle

Menstruation is the result of very neat and standard cooperation from the hypothalamus-pituitary-ovarian endocrine axis. Hypothalamus spurs the pituitary gland by secreting gonadotropin-releasing hormone (GnRH), a deca-peptide secreted pulsatively by the hypothalamus. GnRH pulses for about 90 minutes and secretes GnRH via small blood vessels in the anterior pituitary gland portal system. Gonadotropinspituitary stimulates the synthesis and release of follicle-stimulating hormone (FSH) and luteinizing hormone (LH).[5,6]

FSH is a glycoprotein hormone that stimulates follicle maturation during the follicular phase of the cycle. FSH also helps LH stimulate hormone secretion steroids, especially estrogen, by the granulosa cells of the mature follicle. LH plays a role in steroidogenesis in the follicle and is important in dependent ovulation on the cycling surge of LH. Cyclic activity in the ovary or cycle **of** the ovary is maintained by a feedback mechanism that works between the ovary, hypothalamus, and pituitary.[7]

Menstruation and ovulation

At puberty, each ovary contains 200,000 oogonia. Each month, 15-20 follicles are stimulated to grow by the follicle-stimulating hormone (FSH), and luteinizing hormone (LH) is secreted by the gland pituitary anterior. If one ovum is released and nothing happens during pregnancy, then menstruation will occur. The system settings are complex and have feedback loops. Initial stimulus originates from the hypothalamus with the release of gonadotrophic-releasing hormone (GnRH) into the pituitary portal vein. GnRH stimulates the growth and maturation of gonadotrophs that secrete FSH and LH. FSH acts on 10-20 selected primary follicles by binding to cells granulosa, the thread that surrounds it. The effect of increasing the amount of FSH is the secretion of fluid into the cavity of the follicles, one of which grows faster than the others.[4,5]

At the same time, cell granuloma, the theca surrounding the selected follicles, secrete more estradiol, which enters the blood cycle. Effectendocrinology increase in estradiol levels generates negative feedback on the anterior pituitary and hypothalamus. As a result, FSH secretion decreases while estradiol secretion increases to reach the top. About 24 hours later, there is a large surge of secretions from LH surge and a smaller spike in FSH secretion. Positive feedback causes the release of one ovum from the largest follicle until ovulation occurs.[6-8]

The collapsed follicle, due to the release of the ovum, changes its properties. Cell granulosa Theca proliferates and turns yellow, called luteinteka cells. The collapsed follicle becomes the corpus luteum. Corpus luteum lutein cells produce progesterone and estrogens. Progesterone secretion reaches a flat peak (plateau) about four days after ovulation, then increases progressively when the fertilized ovum implants inside the endometrium. Trophoblast cells implanted embryo immediately produce human chorionic gonadotropin (HCG), which maintains the corpus luteum so that the secretion of estradiol and progesterone continues. On the contrary, if pregnancy does not occur, the theca lutein cells degenerate so that produce less estradiol and progesterone, which reduces the negative feedback on the gonadotrophs that is accompanied by increased FSH secretion. Decreased levels of estradiol and progesterone in the Circulation of blood cause changes in the endometrium, causing menstruation.[9-11]

Endometrial cycle

Menstruation is the periodic discharge of blood, tissue fluid, and debris from the endometrial cells of the uterus in varying amounts. Usually**,** menstruation occurs between 22-35 days, and menstrual blood discharge lasts 1-8 days. In the proliferative phase, there is a regenerative repair process after the endometrium sloughs off during menstruation. The endometrial surface is reformed by metaplasia of stromal cells and outgrowth endometrial glandular epithelial cells, and within three days after menstruation stops, repair of the entire endometrium is complete. In the proliferative phase religious, the endometrium is thin, the glands are few, narrow, straight, and lined with cuboidal cells, and the stroma is dense. The early regenerative phase lasts from day to three menstrual cycles to day seven, when proliferation accelerates.[12,13]

The epithelial glands increase in size and grow vertically downwards against the surface. The cells become columnar, with the nucleus at the base cells stroma proliferating, remaining solid and coiled. Cell division occurs in the glands and stroma. At the time of penetrating basal endometrium, each artery runs straight, but in layers**,** superficial and media arteries turn into a spiral.[14-16]

In the luteal phase, if ovulation occurs, the endometrium will experience marked change, except at the beginning and end of the reproductive period. These changes begin in the last 2 days of the proliferative phase but increase significantly after ovulation. Rich secretory vacuoles Glycogen is present in the cells lining the endometrial glands. Initially, the vacuoles are found in the basal part and shift the nucleus cells in a superficial direction. The amount quickly increases, and the glands become meandering. On the sixth day after ovulation, the secretory phase reaches a peak. Vacuoles have passed through the nucleus. Some of them have been secreted mucus into the gland cavity. Spiral arteries increase the length by straightening the roll. If there is no pregnancy, secretions of estrogen and progesterone decrease as the corpus luteum ages. This aging causes an increase in arachidonic acid and endoperoxides free in the endometrium. These enzymes induce cell lysosome stroma to synthesize and secrete prostaglandins (PGF2α and PGE2) and prostacyclin. PGF2α is a potent vasoconstrictor and causes uterine contractions. PGE2 causes uterine contractions and vasodilators, whereas prostacyclin is a vasodilator that causes muscle relaxation and inhibits platelet aggregation.[15,17]

PGF2α ratio with both prostaglandins increased during menstruation. These changes reduce blood flow through the capillaries endometrium and cause a shift of fluid from the endometrial tissue into the capillaries, thereby reducing the thickness of the endometrium. It is such causing an increase in the twist of the spiral artery as it continues reduced blood flow. The endometrial area supplied by the spiral arteries becomes hypoxic, resulting in ischemic necrosis. The necrotic area from the endometrium peels off into the uterine cavity accompanied by blood and tissue fluids so that menstruation occurs.[2,17]

During the menstrual phase, the lining of the endometrium is superficial, and media is shed, but the deep basal layer of the endometrium is preserved. Loose endometrium, along with tissue fluid and blood**,** form the coagulum in the uterus. The coagulum is immediately liquefied by fibrinolysin and fluid, which is not coagulated and is excreted via the cervix with uterine contractions. If the amount of blood secreted during this process is very much possibly insufficient fibrinolysin, this woman is removing a blood clot from the cervix.[15-17]

Menstrual disorders

Menstruation is considered normal if it occurs between 22-35 days. Disturbance menstruation is most common at the beginning and end of the reproductive period, namely in those under 19 years of age and over 39 years of age. These disturbances may be related to the length of the menstrual cycle or the number and duration of menstruation, a person Women can experience both disorders.[2,14]

Menstruation can come at intervals of more than 35 days, which is called menstruation oligomenorrhea. If menstruation occurs for more than 70 days (without pregnancy), diagnosed as secondary amenorrhea. The diagnosis of primary amenorrhea is made if menstruation has not started by the age of 16 years. Menstruation can also occur at intervals of less than 21 days, which is called amenorrhea or polymeric. The amount of menstrual discharge can vary. The menstrual discharge is little or lightly called hypomenorrhea. Many blood discharges are called menorrhagia. Menorrhagia may be accompanied by an organic condition uterus, or it may occur without any obvious uterine abnormality. This matter is known as dysfunctional uterine bleeding. In violation of the cycle and the amount of menstrual blood, bleeding occurs at irregular intervals, and the amount of menstrual blood very varies. This menstrual pattern is called metrorrhagia. Generally, it indicates local conditions in the uterus.[9]

Primary amenorrhea may be caused by a genetic defect such as dysgenetic gonads that usually have primary sexual characteristics that do not develop. This condition is caused by abnormalities of the Mullerian ducts, e.g., there is no uterus, vaginal agenesis, transverse vaginal septum, or hymen

imperforate. In most cases, there are no abnormalities, and women can hope to get menstruation on time. Some women in this group have eating disorders or too much exercise weight.

The most common cause of secondary amenorrhea is pregnancy. However, this condition can occur during the reproductive period for various causes. Common causes of amenorrhea are weight loss, hyperprolactinemia and prolactin-secretin tumors, hypothalamic-pituitary insensitivity, polycystic ovary syndrome (PCOS), and primary gonadal failure (ovary). Women with eating disorders, especially anorexia nervosa, will experience menstruation that stops, as well as women who do sports compulsively. The cause of amenorrhea is hypothalamic failure to release gonadotropin-releasing hormone by the pituitary gland**,** thereby increasing the amount of estrogen secreted by the ovaries A little.[10,11]

Menorrhagia can be caused by organic causes, but in most cases are, dysfunctional or caused by endocrine changes or local endometrial regulation of menstruation. The reason organic including uterine myoma, especially if the myoma is intramural or submucosa and changing endometrial cavity, internal endometriosis Diffuse, endometrial polyps, chronic pelvic infection (inflammatory disease) pelvis), blood dyscrasias, and hypothyroidism. In metrorrhagia, the amount of bleeding is irregular, not cyclic**,** and often lasts a long time. This condition is usually caused by a condition pathology in the uterus or internal genital organs.[12,13]

2. Conclusion

Menstruation is the result of very neat and standard cooperation from the hypothalamus-pituitary-ovarian endocrine axis. Menstrual disorders can be caused by hormonal factors and organ abnormalities related to menstruation.

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