

**MINISTRY OF HEALTH OF UKRAINE
ODESSA NATIONAL MEDICAL UNIVERSITY**

Faculty international

Department of Obstetrics and Gynecology



Vice-rector for scientific and pedagogical work

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**METHODICAL DEVELOPMENT
to the lecture**

Course IV Faculty international

LECTURE №1 TOPIC. Physiology of female genital organs. Methods of examination of gynecologic patients. General Symptomology in Gynecology.

Approved:

Meeting of the Department of Obstetrics and Gynecology of Odesa National Medical University

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1. Relevance of the topic.

Recognition of gynecologic diseases is based on data from the anamnesis, subjective and objective examinations. A total of subjective and objective methods of examination promotes cognition of the processes which really occur in the patient's organism.

Exact diagnostics, as a result, and rational treatment of gynecologic diseases can be conducted only under conditions of correct examination of the gynecologic patients, conducted on a certain system, which helps to take into account all the details and find the main facts, promoting correct recognition of the disease.

2. Learning Objectives

To acquaint ($\alpha = 1$) To introduce students to current topics, normal menstrual cycle, regulation of menstrual cycle, the volume of the survey of it.

Learn ($\alpha = II$):

1. Clinical anatomy and physiology of female genitalia.
2. Special gynecological anamnesis.
3. General and special methods of examination of gynecological patients.
4. Main special examination methods in gynecology: visual examination of genitals, speculum examination, bimanual examination.
5. Additional specific examination methods.
6. Methods of functional diagnostics of ovaries.
7. Laboratory methods of examination in gynecology: microscopy of urogenital discharge, oncocytopology, bacteriological study, PCR, ELISA, pathomorphological study.
8. Instrumental examination methods in gynecology: uterine probing, curettage of uterine cavity and cervical canal, biopsy, puncture of abdominal cavity through posterial fornix.
9. Endoscopic methods of examination in gynecology: colposcopy, hysteroscopy, laparoscopy.
10. Radiological examination methods in gynecology: MRI, CT, MSG.
11. Ultrasonic examination methods in gynecology: transvaginal and transabdominal USD.
12. General symptomatics of gynecological pathology.

Learn and improve skills ($\alpha = III$):

1. Anatomy of female genital bodies
2. Features histological structure of the endometrium depending on the phases of the menstrual cycle
3. Effect of hormones on target organs
4. The main types of surgical interventions on the pelvic organs of women.
5. Regulation of menstrual function
6. Normal menstrual cycle
7. Classification of menstrual disorders
8. The volume of investigation of patients with disorders of the menstrual cycle, neuroendocrine syndromes.
9. Perform necessary medical manipulations (inspection by means of mirrors)

To be able to ($\alpha = IV$):

1. Collect general and special history, an allocation of a typical case-patient data.
2. Interpret data from a survey of case-patients.
3. Formulate a diagnosis of thematic patient, the differential diagnosis, to appoint a treatment plan.
4. Perform under the theme of practical skills

Clinical anatomy of female genitals.

The female genital tract is divided into external and internal genitalia.

The **external genitalia** (genitalia externa) include the vulva (vulva), which contains all the anatomical structures from the pubis to the perineum: pubis, large pudendal and small pudendal lips,

clitoris, hymen, inlet to the vagina and its glands, female urethra, and also glands and vessels (codogram).

Pubis (mons pubis, mons Veneris) is the lowest part of the anterior abdominal wall, the spherical fat pad above the pubic symphysis (symphysis pubica) covered by skin and hair. Hair appearance and fat sediment on the pubis takes place at the beginning of puberty. The upper edge of the hair forms a horizontal line in women (female type) and in men the hairy integument is located along the white line as a stripe or in the form of a narrow triangle with its apex near the umbilicus (male type). In women hair grows down along the external surface of the large pudendal lips (triangle with its apex downwards). The appearance of the pubic hair changes during the phases of a woman's life. It does not exist in girls before puberty; during the reproductive age it varies in thickness, length and coloration, during menopause the hairy integument becomes thinner. The skin of the pubis contains sudoriferous and sebaceous glands. Quantity of subcutaneous fat depends on heredity, age, diet and, possibly, on the influence of steroid hormones. On the right and left side of the pubic surface, there are pubic tubercles (tubercula pubica). They are description points for determining the external openings of the inguinal canals, where the round ligaments of the uterus come from.

Innervation of the pubis is maintained by branches of the ilioinguinal and genitofemoral nerves.

Blood supply comes from the external genital arteries and veins. The inguinal lymph nodes accumulate lymph from the genital area and surface of the abdomen. Cross lymphatic circulation has an important clinical meaning, because the spread of cancer of the vulva through the inguinal lymph nodes both with the direction of lesion and in a reverse one occurs.

Clinical meaning. Dermatitis, pediculosis (phthyrus pubis) may evolve in the area of the mons pubis. Edema of the mons pubis may appear secondary as a result of infection, trauma, cancerous infiltration of the lymph nodes. Cancer of the vulva may spread to the mons pubis.

The large pudendal lips (labia majora pudendi) - two folds of skin with connective and adipose tela, numerous vascular plexi descending from the mons pubis to the perineum on either side of the pudendal slit (rima pudendi) and forming anterior and posterior commissura of the lips. The large pudendal lips as a rule join in nulliparae but after each labour the distance between them increases and in aged women atrophy occurs. The skin on the lateral (external) surface of the large pudendal lips is covered by hair and pigmented, on the medial (internal) surface - smooth, very thin, and looks like mucous membrane. It contains a lot of sudoriferous and sebaceous glands, their secretion gives off a specific smell to the area of genitalia. The secretion of the sudoriferous glands which are innervated by the sympathetic nervous system (SNS) moistens the pudendal lips and protects them from irritation by vaginal discharge. The secretion of the glands is regulated by hormonal and psychogenic stimuli, its discharge decreases in aged women. In the middle of the large pudendal lips on the border between their medial part and lower one third on either side are the greater vestibular glands (the Bartholin's glands) 10-15 mm in length and 7-10 mm width. Their duct opens on the inner surface of the labia minora at the entrance to the vagina. The viscous grayish secret with alkaline reaction of these glands corresponding with the Cowper glands of the husband, is discharged due to pressing or sexual excitation, which allows normal moisture of the mucous membrane at the entrance to the vagina. The frenulum is a thin bridge, skin fold between the commissura of the labia minora and the large pudendal lips which as a rule ruptures during first labour. To the middle from the frenulum behind the hymen there is a small recess, the fossa of the vestibule of the vagina (fossa vestibuli vaginae). Clinically between the frenulum of the pudendal lips and the anus, the gynaecologic (anterior) perineum is located; between the anus and superior coccyx - posterior perineum.

Innervation. The large pudendal lips are innervated by ilioinguinal and genital nerve anteriorly, and laterally and posteriorly by a branch of femoral cutaneous nerve.

Blood supply of the large pudendal lips comes from the internal (from the internal iliac artery) and external genital (from the femoral artery) arteries. Venous blood outflows by the internal and external genital veins.

Clinical meaning. The large pudendal lips have no special functions. Cyst of the inguinal canal may occur; sometimes it is diagnosed as an indirect inguinal hernia. The large pudendal lips may stick together at vulvitis in girls. As a consequence of external force (trauma) or complicated labour a

hematomae may form. The tumour of the apocrine sudoriferous glands - hydropadenoma, malignase very rarely. Cysts of the sudoriferous glands are benign, but often they become infected.

The small pudental lips (labia minora pudendi) are two small, narrow and thin (there is no adipose layer) folds of skin between the labia majora and the vaginal opening. As a rule, they are covered by labia majora. The labia minora have sudoriferous glands, smooth muscular and elastic fibres and a lot of veins. They are extremely sensitive due to the presence of a number of nervous endings. On the outside the labium minora are lined with stratified squamous epithelium, pink in color, they have no sudoriferous glands and hair follicles. During puberty the sebaceous glands form, they may infect at this period and atrophy during menopause. At the upper part each labium minora is divided into two less folds which encompass the clitoris from aloft form the prepuce (praeputium clitoridis) and on the underside the frenulum of the clitoris (frenulum clitoridis). In the low part the labia minora become thinner, coalescing with the inner surface of the labia majora and forming a small cross partition, the frenulum of the labia-minora (frenulum labiorum pudendi).

Innervation of the labia minora is provided by the ilioinguinal, genital and rectal nerves.

Blood supply of the labia minora is provided by the internal and external genital arteries.

Clinical meaning. The labia minora close the vaginal entrance. They increase as the response to the stimulation by ovarian hormones and without oestrogen stimulation the atrophic changes take place in it. Squamous cell carcinoma of vulva often starts from the labia minora, exactly from the sebaceous glands. A sticking together of the labia minor in girls is an evidence of their inflammation (vulvitis), their adhesion may be an evidence of sexual differentiation disorders.

The **clitoris** is homologous to the penis cylindrical erectile body 2-3 cm in length, located in the anterior coner of the genital rima, between the labia minor. The head of the clitoris is nearly 0.5 cm in diameter, covered by squamous epithelium with numerous nervous endings and sebaceous glands. The clitoris is attached to the lower part of the pubic symphysis by lig. suspensioium clitoridis and consists of two corpi cavernosum. During sexual excitement they observe their erection and as a consequence of it the vaginal entrance narrows. The corpi cavernosum comes from the low edge of the descending branches of the pubic bones, unite in the middle and form the body of the clitoris. The end of the clitoris is surrounded by the edges of the labia minora, their anterior edge forms the prepuce of the clitoris and both posterior edges form its frenulum (frenulum clitoridis). Because of numerous vessels and nerves clitoris is extremely sensitive, its friction causes orgasm. The clitoris is the main erogenic zone in women.

Innervation of the clitoris is provided by the ilioinguinal and genital nerves.

Blood supply of the clitoris is provided by its arteries, branches of the inner genital artery (a. pudenda interna).

Clinical meaning. Cancer of the clitoris is seen very seldom, early metastatic spreading is inherent in it and it involves wide excision. Inguinal and femoral lymph nodes are damaged first, as a rule.

The vestibule of the vagina (vestibulum vaginae) is a triangle-shaped cavity, formed from the urogenital sinus and limited at the top by the clitoris, laterally by the labia minora, and inferiorly and posteriorly by the posterior commissure of the pudental lips and the vaginal vestibule. Its bottom is the hymen. The vestibule vagina is lined with thin squamous epithelium. Six orifices open into it, they are: the urethra, the vagina, two ducts of the greater vestibular glands and two ducts of the smaller vestibular glands.

In the vaginal vestibule under the clitoris the **outer orifice of the urethra** (urethra feminina) is located. It may be of different forms (round, compressed, with two lateral lips) while usually it looks like a turned over letter "V". It, like the whole urethra, is lined with transitional epithelium and as a consequence has more intensive pink color than the mucous of the vaginal vestibule covered with squamous epithelium. Low two thirds of the urethra are located directly over the anterior vaginal wall. The urethral diaphragm supports the urethra position.

Innervation of the urethra is provided by the genital nerve.

Blood supply to the urethra is provided but the internal genital artery and vein.

Clinical meaning. One may observe vegetation of the urethra mucosa, planocellular and transition-cellular carcinoma, developing from urovestibular zone may occur.

Just below the orifice of the urethra there are two small openings of the **smaller vestibular (paraurethral, the Skene's) glands (glandulae vestibularis minores)**, which are rudiments of the Wolffian duct (Fig). These glands are homologous to the prostate (prostata). Their ducts are lined with transitional epithelium. They have common with the urethra innervation and blood supply.

Clinical meaning. The Skene's glands, which produce a small amount mucous, are especially prone to gonococcus infections, which can be revealed for the first time in them. After successful anti-gonococcus therapies, non-specific infection can be recurring, that demands electro-cauterization or laser destruction of the glands' ducts.

The greater vestibular glands (the Bartholin's glands, glandulae vestibulares majores) are homologous to the Cowper's glands (bulbourethral glands) in men. They lie on the postero-lateral surface of the vaginal opening. Their ducts open on either side of the hymen in the vaginal vestibular (Fig. 4, b). Each gland has a narrow duct approximately 2 cm long and partially covered with cavernous tissue, bulbs of the vestibular (bulbi vestibuli, Fig. 5) located from the both sides of the vagina between skin and m. bulbospongiosus. They are homologous to the bulbs of the penis. Viscous greyish mucoid secretion of these glands has alkaline reaction; it excretes at press, sexual excitement and supports normal moistness of the mucosa of the vaginal orifice.

The **hymen** is a thin elastic duplicate of mucosa covered with squamous epithelium which as a rule partially closes the vaginal orifice. It has one (rarely several) excentric opening for the outflow of the menstrual blood. Rarely the hymen has no an orifice. During first sexual contacts the hymen usually tears slightly, mainly inferiorly and laterally and after labour only its remnants may stay, papillae of hymen (carunculae hymenalis).

Innervation and blood supply of the hymen is provided by the genital and inferior rectal nerves, **arteries and veins**.

Clinical meaning. Bartholinitis is an often complication of sexually transmitted diseases and especially hemorrhhea. Abscess of the greater vestibular gland (the Bartholin's) needs a surgical intervention and under relapsing the cyst's marsupialization should be performed. Rigid hymen may cause pain during sexual contacts which requires its dissection (surgical defloration).

The female internal genitalia (**organa genitalia feminina interna**) consist of the vagina, the uterus, the Fallopian tube and the ovaries.

The **vagina** is a tubular muscular-connective structure joining genital area with the uterus located between the urethra and the urinary bladder anteriorly and the rectum posteriorly. Its length along the anterior wall is 7-8 cm and 9-10 cm along the posterior wall. The vagina is narrowed near the hiatus; upwards it widens and ends with the vaults of the vagina. The vagina is a polyfunctional organ; it is an excretory organ of the uterus, the female organ of copulation and part of labour canal. Its upper part is formed from the Müller's ducts, and the low one from urogenital sinus. Anteriorly the vagina is separated from the bladder and the urethra orifice by the vesicovaginal septum; posteriorly it is limited from the rectum by the recto-vaginal septum. The superior one fourth of the vagina is separated from the rectum by the dome-shaped pocket of the peritonium, the rectouterine (Douglas') pouch.

The superior part of the vagina encompasses the uterus' cervix and forms the anterior, posterior and two lateral vaults (fornix). The vaginal walls, anterior and posterior, consist of muscular fascicles, connective tissue and mucous membrane. The muscular fascicles of the vaginal anterior wall spread on the muscular layer of the urethra and the muscular fascicles of its posterior wall — on the inferior part of the rectum. The thickness of the vaginal wall is approximately 3 mm. The vaginal wall consists of the three layers. The mucous membrane of an adult woman vagina is lined with stratified squamous epithelium; it is comparatively smooth on the lateral walls and forms anterior and posterior transversal folds (columnae rugarum) which allows it to stretch well in labour. The vaginal connective tissue is rich in blood vessels and contains lymph nodes. The vaginal mucous membrane is pale pink and during pregnancy it is cyanotic, it is glands-free. The vaginal discharges contain alkaline secretion of the cervix, desquamous epithelial cells and bacteria. Epithelium of the vagina is rich in glycogen which transforms into lactic acid under the influence of normal vaginal flora (Döderlein's bacilli). That is why pH of the vagina is acid (approximately 4.5) what is a protective barrier against infections.

Innervation of the vagina comes from the genital and rectal nerves and pelvic sympathetic plexus.

Blood supply of the vagina is provided by the vaginal branches of the uterine artery which supply blood to its upper one third. The middle one third of the vagina is supplied by blood from the inferior vesical arteries; its low one third is supplied from the middle rectal and inner genital arteries. The venous plexus is located around the vagina, the veins pass along arteries to the inner iliac vein; the veins of the low one third of the vagina go to the femoral arteries. Lymphatic drain of the low one third of the vagina as well as the genital area is provided in the direction of the vaginal lymph nodes and the middle and upper one third of the organ in the direction of the iliac lymph nodes.

Clinical meaning. The vaginal discharge (leukorrhea) is a frequent complication, symptom of local or systemic diseases. The most frequent reason of the vaginal discharge is an infection of the low parts of the reproductive tract. Other reasons may be either oestrogenic or psychogenic stimulation or deficiency of oestrogens as a result of senile atrophic vaginitis. Metastatic cancer of the vagina is met more often than primary one.

The **uterus (s. metra, hystera)** is an unpaired cavitory muscle organ located in the pelvic cavity between the urinary bladder anteriorly and the rectum posteriorly.

The uterus consists of two parts: the upper, the body of the uterus (**corpus uteri**) and the low, the neck of the uterus (**cervix**). The upper part of the corpus is called the fundus of the uterus (**fundus uteri**) and in the cervix has 2 parts supravaginal and vaginal parts. There is the isthmus of the uterine (**isthmus uteri**) between its corpus and cervix, the clinical title is orificium internum uteri (some authors distinguish the anatomic and hystologic internum uteri). The uterine wall consists of three layers, the internal mucous membrane (endometrium), the middle, muscular layer (myometrium), the external serous membrane (perimetrium). The uterine mucous membrane has two layers, the basal layer and the functional layer.

The **cervix** of the uterus is conic-shaped in a nullipara and 2-4 cm long with an average caliber of 2.5 cm. The canal of the neck of the uterus (**canalis cervicalis uteri**) has a rounded orifice (**ostium of the uterus**) which has anterior and posterior lips. Approximately half of the length of the cervix is its supravaginal portion; to the front the urinary bladder lies. The vaginal portion of the cervix up to the uterine orifice is lined with squamous epithelium, the cervical canal – cylindrical secretory epithelium, its glands, produce cervical mucous. Apart from the epithelial layer of the canal, the cervix 85% consists of connective tissue and 15% consists of circular muscular fibers which merge with myometrium superiorly. The corpus uterus, vice versa, consists of 85% muscular fibers and only 15% —connective tissue. The anatomic structure of the cervix changes during pregnancy and labour. Traumatic damage during labour cause changes connected with its location and form. The uterine orifice becomes slot-like. The cervix is held in its position due to the pubocervical, sacrouterine and transversal (cardial) ligaments.

Innervation of the cervix is from the second, third and fourth pair of sacral nerves and pelvic sympathetic plexus.

Blood supply is provided by the uterine, ovarian and internal genital arteries and veins.

Clinical meaning. Ectopia of the cylindrical epithelium of the cervical canal can lead to postcoital (contact) bleedings and infections. Squamous cell carcinoma of the cervix (second most frequent disease in women) in 90% of cases occurs at the junction of the cylindrical and flat epithelium. Cervicitis, especially with specific etiology, is often accompanied by leucoria and can cause infertility.

In reference to the pelvic axis the uterus is curved forward (anteflexio) in most cases or (rarely) backward (retroflexio). The body of the uterus is bent forward (anterversio) in reference to the cervix too. The peritoneum covers the posterior surface of the urinary bladder, turns at the level of the uterine isthmus and forms the vesicouterine pouch (excavatio vesicouterine). Encompassing the uterus from behind, the peritoneum comes down the cervix, covers the posterior vaginal fornix and turns on the rectum, forming the rectouterine pouch (excavatio retrouterinae, Douglas pouch). Laterally the rectouterine pouch is limited by the rectouterine folds (plicae rectouterinae) of the peritoneum which stretch to the lateral surface of the rectum and are the uterine fixating apparatus. The fascicles of the smooth muscles (mm. rectouterini) pass in these folds. From the both sides of the uterus the peritoneum forms the folds, the right and left broad ligaments of the uterus located in the frontal plane. This ligament forms the mesosalpinx relating to the Fallopian tube, and relating to the ovary it forms

the mesovarium and relating to the uterus — mesometrium. Part of the broad ligament of the uterus fixating its cervix is called the transversal (cardial) ligament of the uterus. The anterior layer of the large ligament of the uterus covers the round ligament of the uterus (lig. teres uteri) which stretches from the corner of the uterus, passes via the deep inguinal ring, comes up to the pubic symphysis and fixates on the mons pubis to the tub. pubicum.

The **blood supply** to the uterus includes the uterine, ovarian arteries and the arteries of the round ligament of the uterus. The uterine arteries run from internal iliac artery (a. iliaca interna s. a. hypogastrica) the ovarian — from the aorta, and they enter the broad ligament of the uterus via the ligament which supports the ovary. The uterine artery stretches along the uterine rib; on the level of the orificium internum uteri it divides into two branches - the ascending and descending branch, which in turn give off branches to the broad and round ligament, Fallopian tubes, ovary and superior portion of the vagina. At about 1-2 cm from the uterus the uterine artery crosses with the ureter and branches off again (ramus uretericum).

The ureters cross with the ovarian vessels, located above them on the level lin. innominata. They go retroperitoneally to the broad ligament of the uterus attaching to its posterior layer then descending entering into the parametrium behind the uterine arteries crossing it transversally. Then the ureters almost close adjoins the anterior vaginal fornix and comes to the cervix in front of the urinary bladder (from the right - 10-12 cm; from the left - 2-3 cm).

Lymph outflow from the uterus into the superficial inguinal nodes, external iliac, lateral sacral, paraaortal and paracaval lymph nodes.

The uterine **innervation** is provided mainly by sympathetic nervous system. Parasympathetic nervous system is represented by the branches of the middle inferior pelvic plexus and by the second, third and fourth pairs of the sacral nerves.

Clinical meaning. The uterus is one of the organs of the female reproductive function. The development or acquired defects (for example, Ashermann's syndrome) may be the reason for reproductive dysfunction. The endometrium is the most frequent localization of cancer in women. Benign tumoral processes, leiomyomae and adenomyosis, develop often in the myometrium.

The **uterine appendages** include the Fallopian tubes and ovaries.

The **Fallopian tube (tuba uterina, s. tubae Fallopii)** is a pair organ stretching from the uterus to the ovaries; it performs transportation of the ovocytes into the cavity of the uterus. It is approximately 10 cm long; its caliber differs from 0.5-10 mm to 5-8 mm in different portions. They differentiate the uterine portion of the tube - the narrowest portion, isthmus, ampule and infundibulum (the broadest portion).

The wall of the tube consists of three membranes, external (serous), middle (muscular) and internal (mucous). The serous membrane of the uterine ligament which forms the mesosalpinx. There is the subserous layer of connective tissue under serous membrane. It contains vessels and nerves. The muscles of the Fallopian tube consists of the internal circular and external longitudinal layers which supply its peristaltic contractions. The mucous membrane of the uterus forms longitudinal tubular folds and it is laid with monostratal columnar ciliated epithelium with goblet glands.

The infundibulum of the Fallopian tube is the broadest portion of the tube. There is an orifice opening into the peritonium with a caliber from 5 to 10 mm in it. There are a great number of the fimbriae of the tube around the opening. The largest fimbria is called the ovarian fimbria. These structures may form small fimbrial cysts, hydatids, which are mesonephral by origin. Such rudimentary formations as epoophoron and its longitudinal duct (ductus Gartneri) and paraophoron start from mesonephros. Distention intraligamental and nearovarian cysts and malignant tumors can form these formations.

Innervation of the Fallopian tubes is provided by the branches of the pelvic and ovarian parasympathetic and sympathetic ligaments.

Clinical meaning. Tubal pregnancy, salpingitis (mainly of gonococcal and chlamydial etiology), perisalpingitis (often of streptococcal etiology) are the most often pathological process in the Fallopian tubes. Tubal deformity with formation of commissures because of infection may be the reason of infertility. Primary tubal cancer is met very rarely.

Ovary (ovarium, oophoron) is the female sexual gland, a pair oval organ. Its sizes vary during reproductive period; it is 2.5 cm to 5 cm long; 1.5 to 3 cm broad and 0.6-1.5 cm thick. After menopause the ovarian sizes decrease significantly. The ovary is attached to the broad ligament of the uterus with the mesovarium. During the uterine corner it is connected by the proper ovarian ligament (lig. ovarii proprium), with the pelvic lateral wall by the suspensory ligament of the ovary (lig. suspensorium ovarii). They distinguish two surfaces in the ovary, the internal surface facing to the abdominal cavity and the external surface facing to the pelvic wall; two ends, the uterine and pelvic; two margins, the convex free (margo liber) and mesovarian (margo mesovaricus). In the area of the mesoovarian margin the ovarian hili are located (hilum ovarii), the vessels and nerves enter the ovary via them.

On the ovarian section one can see the external layer, a cortical substance of the ovary and the internal layer, a medullar substance of the organ.

The external layer, laid with the germinal epithelium is called the tunica albuginea. The ovarian stroma is located under it (stroma ovarii), it is the area of follicles, of different stages of development. The free surface of the ovary is laid with monostratal cubical epithelium.

The follicles increase as they mature. Tertiary (dominant, Graafian) follicle reaches the ovarian surface, ruptures, pushes out the ovum via stigma and then it luteinizes through the retention of the follicular liquid and forms the corpus luteum, the function of which is the progesterins secretion and the organism preparation for the impregnated ovum implantation. The hormones secretion (mainly progesterins, oestrogens and androgens) is effected by endocrinocytes (luteinocytes and thecal endocrinocytes) of the corpus luteum. In the course of time the corpus luteum hyalizes and forms the white body (corpus albicans).

A newborn girl has 100,000 of primary (primordial) follicles, but only 400 of them can mature. But in every cycle during the reproductive period several follicles can start to develop and produce hormones; later they will be subject to atresia and absorbed.

Clinical meaning. The function of the ovaries is the production of hormones and development of the ovum for fertilization and pregnancy. This function is depended upon many factors. Benign and malignant tumors often develop in the ovary. The ovarian torsion may result in its necrosis. Infectious damages of the ovary may develop in climacterium.

Physiologic position of the female internal genitalia is kept by fixating, supporting and suspending apparatuses. Supporting the uterus and uterine appendages in physiologic position, they afford their mobility in considerable limits, what is important for normal development of pregnancy and course of labour.

The suspending apparatus of the uterus and uterine appendages consists of the following pair ligaments connecting these organs with one another and with the pelvic walls:

- 1) the broad ligament of the uterus (lig. latum uteri), which leads to the lateral walls of the pelvis and there turns into parietal peritoneum, form the mesometrium, mesosalpinx, and mesovarium;

- 2) the suspensory ligament of the ovary (lig. suspensorium ovarii) is an external portion of the large ligament of the uterus which runs from the ovary to the lateral pelvic wall. The ovarian vessels pass in it (a. et v. ovarica);

- 3) the proper ovarian ligament (lig. ovarii proprium) runs in the depth of the posterior layer of the large lig. of the uterus and goes from the uterine margin of the ovary to the uterus. The ligament contains smooth muscular fibers, it is crossed with the ovarian branches of the uterine arteries and veins;

- 4) the round ligament of the uterus (lig. teres uteri).

Subperitoneally there is the layer of the fatty tissue, parametrium, between the layers of the broad ligament of the uterus as well as around the cervix and the vagina.

The fixating apparatus of the uterus contains the following ligaments formed from smooth muscular and connective tissue:

- 1) the mesometrium (mesometrium, the transversal, main lig. of the uterus) encompasses the cervix from the isthmus; the fibers turn into the pelvic fascia which fixates the uterus to the pelvic fundus;

2) the pubovesical muscle (m. pubovesicalis) runs in the depth of the rectouterine folds (plicae rectouterinae) which go posterior surface of the cervix to the lateral surface of the rectum.

3) the sacrouterine ligament which runs from the posterior surface of the cervix below the internal orifice, to the side by the rectum and comes together with the pelvic fascia at the internal surface of the sacrum.

During pregnancy the suspending and fixating folds stretch and give the uterus mobility, necessary for it to grow.

The supporting apparatus of the female internal genitalia is formed by a group of muscles and fascia which constitute the perineum or the pelvic fundus. The muscles of the pelvic fundus are divided into three layers – external, middle, internal.

The internal layer consists of these muscles:

- 1) two m. ischio cavernosus – paired muscles which run from the sciatic tuberculum to the clitoris;
- 2) two m. bulbospongiosus, which run along both sides of the entrance to the vagina;
- 3) external muscle, the sphincter of the anus, which makes a ring around the anus;
- 4) Superficial transversal muscles which run from the internal surface of the ischial tuberculum to the fascia center of the perineum where it joins the same muscle on the other side.

The middle layer of the perineum (urogenital diaphragm) is formed by two layers of the perineum 1) m. sphincter urethrae, 2) m. transversus perinae profundus.

The internal layer (the pelvic diaphragm) is formed by m. levator ani. It in turn, is formed by three pairs: pubococcygeal muscles, puborectal muscle, iliococcygeal muscle.

As a result of trauma to the perineum during labor, the pelvic diaphragm is damaged. During reconstructive operations on the perineum, the muscles should be reconstructed carefully because it is these muscles that keep the female internal genitalia in the physiological position.

Physiological changes of female genitals in different age periods. Neuroendocrine regulation of reproductive system function.

The Female Reproductive Cycle

Towards the end of puberty, girls begin to release eggs as part of a monthly period called the female reproductive cycle, or menstrual cycle (menstrual referring to "monthly"). Approximately every 28 days, during ovulation, an ovary sends a tiny egg into one of the fallopian tubes. Unless the egg is fertilized by a sperm while in the fallopian in the two to three days following ovulation, the egg dries up and leaves the body about two weeks later through the vagina. This process is called menstruation. Blood and tissues from the inner lining of the uterus (the endometrium) combine to form the menstrual flow, which generally lasts from four to seven days. The first period is called menarche. During menstruation arteries that supply the lining of the uterus constrict and capillaries weaken. Blood spilling from the damaged vessels detaches layers of the lining, not all at once but in random patches. Endometrium mucus and blood descending from the uterus, through the liquid creates the menstruation flow.

Menstrual cycle

The reproductive cycle can be divided into an ovarian cycle and a uterine cycle (compare ovarian histology and uterine histology in the diagram on the right). During the uterine cycle, the endometrial lining of the uterus builds up under the influence of increasing levels of estrogen (labeled as estradiol in the image). Follicles develop, and within a few days one matures into an ovum, or egg. The ovary then releases this egg, at the time of ovulation. After ovulation the uterine lining enters a secretory phase, or the ovarian cycle, in preparation for implantation, under the influence of progesterone. Progesterone is produced by the corpus luteum (the follicle after ovulation) and enriches the uterus with a thick lining of blood vessels and capillaries so that it can sustain the growing fetus. If fertilization and implantation occur, the embryo produces Human Chorionic Gonadotropin (HCG), which maintains the corpus luteum and causes it to continue producing progesterone until the placenta can take over production of progesterone. Hence, progesterone is "pro gestational" and maintains the uterine lining during all of pregnancy. If fertilization and implantation do not occur the corpus luteum degenerates into a corpus albicans, and progesterone levels fall. This fall in progesterone levels cause

the endometrium lining to break down and sluff off through the vagina. This is called menstruation, which marks the low point for estrogen activity and is the starting point of a new cycle.

Common usage refers to menstruation and menses as a period. This bleeding serves as a sign that a woman has not become pregnant. However, this cannot be taken as certainty, as sometimes there is some bleeding in early pregnancy. During the reproductive years, failure to menstruate may provide the first indication to a woman that she may have become pregnant.

Menstruation forms a normal part of a natural cyclic process occurring in healthy women between puberty and the end of the reproductive years. The onset of menstruation, known as menarche, occurs at an average age of 12, but is normal anywhere between 8 and 16. Factors such as heredity, diet, and overall health can accelerate or delay the onset of menarche.

Signs of ovulation. The female body produces outward signs that can be easily recognized at the time of ovulation. The two main signs are thinning of the cervical mucus and a slight change in body temperature. Thinning of the Cervical Mucus

After menstruation and right before ovulation, a woman will experience an increase of cervical mucus. At first, it will be thick and yellowish in color and will not be very plentiful. Leading up to ovulation, it will become thinner and clearer. On or around the day of ovulation, the cervical mucus will be very thin, clear and stretchy. It can be compared to the consistency of egg whites. This appearance is known as 'spinnbarkeit'.

Temperature Change

A woman can also tell the time of ovulation by taking her basal body temperature daily. This is a temperature taken with a very sensitive thermometer first thing in the morning before the woman gets out of bed. The temperature is then tracked to show changes. In the uterine cycle, a normal temperature will be around 97.0 – 98.0. The day of ovulation the temperature spikes down, usually into the 96.0 – 97.0 range and then the next morning it will spike up to normal of around 98.6 and stay in that range until menstruation begins.

Both of these methods are used for conception and contraception. They are more efficient in conception due to the fact that sperm can live for two to three days inside of the fallopian tubes. A woman could be off by a couple of days in her calculations and still become pregnant.

Menopause is the physiological cessation of menstrual cycles associated with advancing age. Menopause is sometimes referred to as "the change of life" or climacteric. Menopause occurs as the ovaries stop producing estrogen, causing the reproductive system to gradually shut down. As the body adapts to the changing levels of natural hormones, vasomotor symptoms such as hot flashes and palpitations, psychological symptoms such as increased depression, anxiety, irritability, mood swings and lack of concentration, and atrophic symptoms such as vaginal dryness and urgency of urination appear. Together with these symptoms, the woman may also have increasingly scanty and erratic menstrual periods.

Technically, menopause refers to the cessation of menses; the gradual process through which this occurs, which typically takes a year but may last as little as six months or more than five years, is known as climacteric. A natural or physiological menopause is that which occurs as a part of a woman's normal aging process. However, menopause can be surgically induced by such procedures as hysterectomy.

The average onset of menopause is 50.5 years, but some women enter menopause at a younger age, especially if they have suffered from cancer or another serious illness and undergone chemotherapy. Premature menopause is defined as menopause occurring before the age of 40, and occurs in 1% of women. Other causes of premature menopause include autoimmune disorders, thyroid disease, and diabetes mellitus.

Premature menopause is diagnosed by measuring the levels of follicle stimulating hormone (FSH) and luteinizing hormone (LH). The levels of these hormones will be higher if menopause has occurred. Rates of premature menopause have been found to be significantly higher in both fraternal and identical twins; approximately 5% of twins reach menopause before the age of 40. The reasons for this are not completely understood. Post-menopausal women are at increased risk of osteoporosis.

Perimenopause refers to the time preceding menopause, during which the production of hormones such as estrogen and progesterone diminish and become more irregular. During this period fertility diminishes. Menopause is arbitrarily defined as a minimum of twelve months without menstruation. Perimenopause can begin as early as age 35, although it usually begins much later. It can last for a few months or for several years. The duration of perimenopause cannot be predicted in advance.

The **neuroendocrine system** is composed of the hypothalamus and pituitary gland and is under the influence of neurotransmitters and neuropeptides that regulate hypothalamic releasing and hypothalamic release inhibiting hormones secreted into the blood vessels that connect the hypothalamus and pituitary gland. The release of these hypothalamic hormones influences the secretion of anterior pituitary hormones that subsequently regulate tissue function. The hypothalamus and pituitary gland have the capacity to detect humoral secretions (hormones secreted) from target tissues and adjust hormone production to maintain an optimal internal "milieu" appropriate for normal function. It is well-established that the neuroendocrine system has a critical role in integrating biological responses and influencing: (1) cellular protein synthesis and general metabolism through the release of growth hormone and thyroid-stimulating hormone (TSH), respectively, (2) reproductive function through the release of luteinizing hormone (LH), follicle-stimulating hormone (FSH), prolactin, and oxytocin, and (3) plasma electrolytes and responses to stress through regulation of the hormones vasopressin (antidiuretic hormone, or ADH) and adrenocorticotropin (ACTH). In addition, the hypothalamus also has an important role in the integration of parasympathetic and sympathetic nervous system activity, and can thereby influence a wide variety of functions, including heart rate, blood pressure, vascular responses, and glucose metabolism. The hypothalamus has been implicated in the regulation of biological rhythms by its interactions with hypothalamic nuclei. More recently, the regulation of fat metabolism and food intake has been shown to be regulated through the hypothalamus by its response to the protein, leptin, and its synthesis of neuropeptide Y. It should be noted that the classification of hormones and their primary function presented here is an overly simplistic view of the neuroendocrine system, since critical interactions occur among these hormones that contribute to the coordinated regulation of cellular and tissue function.

Three classic examples of age-associated changes in neuroendocrine regulation, and the resulting consequences for tissue function, help emphasize the importance of this system in the development of the aging phenotype. First, with increasing age there is a decline in growth-hormone secretion that results in a decrease in insulin-like growth factor-1 (IGF-1) production in the liver and other tissues. The loss of these anabolic hormones contributes to the general decline in cellular protein synthesis, skeletal muscle mass, immune function, and cognitive ability in rodents, nonhuman primates, and humans. The decrease in growth-hormone release from the pituitary gland results from impaired release of growth-hormone-releasing hormone and increased release of somatostatin (an inhibitor of growth hormone) from hypothalamic neurons. Second, decreased secretion of gonadotropin-releasing hormone (GnRH) from hypothalamic neurons results in a decline in luteinizing hormone. This is the primary factor in the loss of reproductive cycles in the female rodent, and, in conjunction with the loss of ovarian follicles, contributes to the decline in estrogen levels in women. These latter changes result in atrophy of secondary reproductive tissues and have been implicated in the post-menopausal loss of bone and cognitive function. Decreased GnRH secretion in the male also contributes to a decrease in LH and androgen levels and to the corresponding loss of skeletal muscle mass and reproductive function. Finally, increased secretion of ACTH and the adrenal hormone, cortisol, in response to stress have been reported to contribute to atrophy and/or loss of neurons, as well as age-related decline in cognitive function. These latter findings have contributed to the hypothesis that increased levels of glucocorticoids contribute to brain aging.

Although other mechanisms are possible, the alterations in the secretion of hypothalamic hormones with age have been traced to deficiencies in the secretion of brain neurotransmitters. For example, the activity of dopamine and norepinephrine decreases with age, and both acute and chronic procedures used to increase levels of these neurotransmitters in aged animals have been shown to restore some aspects of neuroendocrine function. Studies have shown an increase in growth hormone release and a restoration of some aspects of reproductive function in older animals in response to the L-Dopa,

dopamine and norepinephrine precursor. These findings have led investigators to conclude that a decline in neurotransmitter activity is a contributing factor in the neuroendocrine decline that accompanies aging. Nevertheless, the possibility that interactions with other hypothalamic peptides, the loss of neurons, or intracellular changes within hypothalamic neurons contribute to the loss of function cannot be excluded. In fact, the inability of hypothalamic neurons to compensate for the age-related alterations in circulating levels of hormones supports the concept that the normal feedback mechanisms that occur within the hypothalamus are impaired in aged animals. Whether these altered feedback mechanisms are related to the deficiencies in neurotransmitters or result from other aberrations within the aging neuroendocrine system remain to be established. Nevertheless, deficits in the regulation of these critical hormonal systems contribute to deterioration of tissue function and undoubtedly are an important factor in age-related disease and disability.

Menstrual function regulation.

The activity of reproductive system is to reproduce, preservation of the species, that causes its ultimate reliability. Reproductive system as well as other systems of the organism is functional and is based on hierarchical principle consisting of 5 central and peripheral levels of regulation interacting by the direct and retroaction connections model.

I level of regulation – suprahypothalamic cerebral structures. The classical example of the cyclic process in female organism in the maturity period is ovario-menstrual cycle.

II level of reproductive system regulation - hypophysiostrophic zone of mediobasal pituitary gland. A pulsing secretion of hypothalamic releasing-hormones(HRH) in the neurons of arcuate nucleus in cirochal regimen occurs. The neurosecretion.(HRH) is transmitted to the portal system through the axons of nervous cells and is transported to the frontal part of pituitary gland with blood

III level of regulation – adenohipophysis (the frontal part of the pituitary gland). The secretion of gonadotropic hormones is performed in adenohipophysis; luteinizing one(LH), folliclestimulating(FSH), prolactine(PI), thyreotrophic hormone or thyreotropin(TH or TTH), somatotrophic hormone or somatotropin(STH), adenocorticotrophic hormone or corticotropin(ACTH), melanocyststimulating hormone of melanotropin(MSH).

IV level of reproductive system regulation is ovarian. Cyclic changes in ovaries are called ovarian cycle. In the first phase primordial follicle develops, at the second one Luteal follicle develops from the cells of Graafian follicle(the follicle where the process of ovulation occurred) endocrine gland – yellow body is formed.

Organs and target organs (genitals, mammary glands, hair follicles, skin, fat tissues) belong to the V level of regulation. The cells of these organs have receptors to sex hormones (estradiol, progesterone, testosterone). The amount of steroid hormones in blood changes depending on the phase of menstrual cycle. The molecule of hormone is taken by the cytoplasmic receptor and complex hormone-receptor is transported to the cell nucleus. In the nucleus the complex is attached to the chromatin, which regulates the processes of transcription. Cyclic adenosinemonophosphat (cAMP) and prostogladines also belong to the V level of reproductive system which act as intracellular regulators. On the V level of regulation cyclic the changes are mostly marked in endometrium (uterine cycle), the process of its preparation to menstruation or implantation is on.

The menstrual cycle regulation starts in pituitary gland. The neurons of hypothalamus integrate exogenous and endogenous information that comes from different departments of central nervous system (CNS). Such factors as starvation, stress may influence menstrual cycle through hypothalamus. Hypothalamus takes part in the regulation of sexual behavior, body temperature, consumption of food and water. Gonadotrophin-releasing hormone is a mediator for hypophysis, it is secreted in pulsating rhythm and is transported to the adenohipophysis through hypothalamo- hypophysial portal vessels. Slight amplitudal and pulsatile drift during the discharge of HT-RH show changes in hypothalamic and hypophysial functions, causing new menstrual cycle. Pulsatile secretion of gonadotrophin-releasing hormone by hypothalamus not inhibited by a considerable amount of estrogen and progesterone, contributes to increase of gonadotrophine discharge by hypothalamus(PSH and LH in a lesser degree). PSH stimulates folliculogenesis in ovaries. Developing follicles discharge estrogen. By the 5-7th day of menstrual cycle one follicle starts to dominate and intensively to discharge estradiol,

other follicles are involuted (atresia). This is a follicular phase, it responds to the proliferative phase of menstrual cycle.

The secretion of GH-PH is under the influence of neuromediators: dopamine and norepinephrine, B-endorphine, the amount of which depends on the action of estrogen and progesterone. That is why the drugs which affect the metabolism of neurotransmitters can influence the secretion of HT-RH and prolactin(Prl) by hypothalamus (methyldopa, reserpine, antidepressants).

Menstrual dysfunction may result from intense production of estrogen and progesterone by the functional cyst of ovaries (for example in yellow body persistence etc.).

The age of menarche (the first menstruation in life) normally ranges from 10 to 16 years old and on average is 12-13. Stabilization of ovulatory menstrual cycle is characterized by regular, cyclic, prognosed menstruations with 24-35 day intervals, the bleeding duration is 3-8 days and general loss of blood about 30-80 ml.

Main methods of examination in gynecology: visual examination of external genitals, speculum examination, bimanual examination.

Main methods of examination in gynecology includes:

- 1) Examination of the external genitalia;**
- 2) The study with the help of a speculum;**
- 3) Vaginal examination;**
- 4) two-handed (bimanual) study;**
- 5) rectal and vaginal-rectal research;**

1.1. On examination of the external genitalia take into account the degree and nature of hair (on the female or male pattern), the development of small and large labia, the state of the perineum, the presence of pathological processes (varices, ulceration, discharge, warts), the state of the external opening of the urethra, excretory ducts Bartholin glands, the hymen.

1.2. When vaginal study determined the state of the pelvic floor, palpate the area location Bartholin glands, urethra orifices. Determine the condition of the vagina, the vaginal part of the cervix, cervical mobility, identifying features of vaginal vault.

1.3. When vaginal study determined the state of the pelvic floor, palpate the area location Bartholin glands, urethra orifices. Determine the condition of the vagina, the vaginal part of the cervix, cervical mobility, identifying features of vaginal vault.

1.4. Handed vagina to bryushnostenochnoe isledovanie is the primary method of detection of diseases of the uterus, appendages, uterine ligament apparatus, pelvic peritoneum and fiber. First, examine the uterus (the position, size, shape, consistency, mobility, tenderness), on each side of the uterus - the appendages (if physiology can not be palpated), ligaments, pathological processes in the pelvic peritoneum.

1.5. Rectal and rectal vaginal study produced for girls in the case of atresia or stenosis of the vagina, in addition to the two-handed at the genitals tumors (cancer w / uterus), with inflammatory diseases, presence of secretions from the rectum. During the study, determine the presence of pathological processes in the rectum to feel w / the uterus, pelvic fat, sacro-uterine ligaments. When recto-bryushnostenochnom method of investigating body of the uterus and appendages. In the case of pathologies in the walls of the vagina, intestine and surrounding tissue produce rectovaginal study to determine the tumor infiltrates and others.

Instrumental examination methods: probing of uterus, curettage of uterine cavity, biopsy, puncture of abdominal cavity through posterior vaginal fornix.

1. Probing the uterus produce under aseptic and antiseptic. It allows you to specify the length of the uterus, cervical canal patency, stenosis and atresia, partitions, fibroids. Probing is used not only for diagnostic purposes, but before endometrial curettage, abortion. Sounding the uterus is contraindicated in acute and subacute inflammatory diseases vagina, w / uterus and appendages, when establishing or suspected pregnancy.

2. **Fractional diagnostic curettage** of the mucous membrane of the cervix and uterine body channel produce to determine the state of the mucous membrane in benign and malignant processes (hyperplasia, precancerous lesions, cancer). First, scrape the mucous membrane of the cervical canal, then the body of the uterus. Scrapings are collected separately in receptacles with formalin, labeled and sent for histological examination.

3. **Biopsy** produced in pathological processes, suspected malignancy localized in the area of the cervix, vagina, external genitals and the uterus. Material taken by excision with a scalpel on the border of healthy tissue and the altered area.

4. **Aspiration biopsy** is performed by Brown syringe in inpatient and outpatient. Get the endometrium of the uterus different departments (bottom corners). From the resulting material make smears on a slide.

5. **Aspiration curettage** performed a special hollow curette, connected to a vacuum pump. Aspiration preparation method has advantages over the endometrial mucosa of the uterus due to scraping traumatization of tissue at the possibility of re-use and during the menstrual cycle.

6. **Puncture of the abdominal cavity through the posterior vaginal fornix** is carried out in order to generate content for the differential diagnosis of ectopic pregnancy and inflammation of the uterus, at break cystic abscess formation or breakout. If you suspect an ovarian cancer - to detect in the ascites fluid of atypical cells. A puncture is made in the center of the posterior fornix of the vagina to a depth of 2 cm. Thick needle.

Endoscopic examination methods: colposcopy, hysteroscopy, laparoscopy.

1. **Colposcopy** - method of diagnosis of pathological states vaginalis of the cervix, cervix, vagina and external genitalia. With the help of a colposcope inspect the mucous membranes of the vagina and the cervix, vulva, produce biopsy. To evaluate the pathological focus in the dynamics method is used repeatedly, it is harmless. It uses simple (Review), enhanced, color (chromocolposcopy) and fluorescent colposcopy. Simple colposcopy estimated, determine the shape and size of the vaginal w / uterus, the external os, color and relief of the mucosa, the transition zone of a flat columnar epithelium, vascular pattern. Extended colposcopy based on the use of pharmacological agents to detect changes in the tissue level of the cell and its components. 3% solution of acetic acid, 0.5% solution of salicylic acid causes swelling of the epithelium of the cervix treatment reduced blood flow, thereby detecting pathological changes. Lugol solution (Sheeler test) reveals tumor and premalignant sites consisting of depleted glycogen cells: cells containing a sufficient amount of glycogen (normal), painted in a dark brown color, with a deficit of glycogen cells (pathological) remain pale. The sample allows purposefully to explore certain areas and carry out biopsy. Colposcopy can detect background processes w / uterus (ectopic, conversion zone, erosion, polyps), precancerous lesions (dysplasia), malignant diseases, to produce differential diagnosis. When colposcopy fluorescent histochemical study used. Colpomikroskopiya - vivo study of morphological study of the vaginal part of the cervix.

2. **Hysteroscopy** - the uterine cavity examination method using an optical instrument (hysteroscope) inserted into the uterus through the cervical canal. Highly informative method for the diagnosis of intrauterine pathology (as compared to MSG, US), allowing to make surgery. Environment for distention is 30-70% solution of dextran, 5-10% solution of dextrose and carbon dioxide. According to its purpose diagnostic hysteroscopy is divided into (establishment of intrauterine pathology), surgical (operational) and control (evaluation of the effectiveness of therapy).

Indications for hysteroscopy: DMK, infertility, developmental abnormalities, intrauterine adhesions, submucous uterine fibroids, uterine cavity examination and cervical canal after the abortion and haemorrhage after caesarean section, plastic surgery on the uterus, endometrial hyperplasia, polyps, foreign bodies in the uterus (IUD), aiming biopsy, monitoring the effectiveness of therapy, endometriosis, uterine tuberculosis.

Contraindications: acute infectious processes, pregnancy, heavy uterine bleeding, suspected cancer of the cervix and uterine body, severe somatic diseases. hysteroscopy technique involves the preparation and examination of the patient for surgery, the choice of anesthesia method (intravenous anesthesia), carrying out the procedure. Complications: exacerbation of chronic inflammatory disease, uterine

perforation, uterine rupture, bleeding, air embolism, vascular overload, thermal lesions of the pelvic organs, anaphylactic shock.

3. Laparoscopy - osmotr abdominal organs and pelvis using the laparoscope through the anterior abdominal wall, in the background pneumoperitoneum used oxygen, nitrous oxide or carbon dioxide. Laparoscopy involves the steps of: abdominal wall puncture needle, the introduction of gas through it to create a pneumoperitoneum, trocar laparoscope, viewing pelvic and abdominal surgery, removal of the endoscope and gas removal. Laparoscopy is done for diagnostic and surgical purposes is carried out in a planned or emergency basis. Indications for routine diagnostic laparoscopy, infertility, dif. diagnosis of tumors of internal genital malformations of internal genital organs, sklerokistoz ovarian ectopic, pregnancy. The **indications for emergency laparoscopy**: a suspicion of uterine perforation, cyst capsule rupture, piosalpinks, ovarian torsion leg tumor, ovarian rupture, pipe miscarriage, dif. Diagnosis of acute adnexitis, ectopic pregnancy and appendicitis.

Contraindications: decompensation of somatic diseases, extensive adhesions, acute infectious diseases. Complications: emphysema, damage of the abdominal cavity needle or trocar, vascular injury, complications of anesthesia.

Ultrasonic examination methods in gynecology.

US - the leading method of research in gynecology: screening, non-invasive, harmless, highly informative, relatively simple, affordable. With this method it is possible to visualize and evaluate the condition of the pelvic organs: the bladder, uterus, ovaries, vagina proximal department rektosigmoidalny thick intestine, muscle, and blood vessels of a small basin. Ultrasound does not require special preparation of the patient, only filling bladder bubble.

Contraindications method does not. The main indication for ultrasound examination in gynecology is a refinement of data on the size of the uterus and ovaries. Ultrasound reveals diseases of the uterus, ovaries, fallopian tubes, abnormal development of the internal reproductive organs, tubo-ovarian formation, ectopic pregnancy, the IUD, and their complications. For the detection of endometrial pathology, dynamic assessment of maturing follicles preferred transvaginal sonography. This method is highly informative studies (assessment of the pelvic organs in severe adhesions, accurate topical diagnosis of education, the use in women with metabolic disorders, flatulence, abdominal pain), there is no need for filling the bladder. Preferred is in urgent gynecology. Ultrasound is now complemented by Doppler studies for blood flow in the arteries and veins of the internal reproductive organs to diagnose tumors, genesis of infertility, other endocrine diseases.

Radiological examination methods: MRI, CT, MSG.

With the development of ultrasound and endoscopic methods of X-ray diagnostics was used less frequently.

The following types of x-ray studies are used in gynecology: hysterosalpingography, pnevmopelviografiya, contrast peritoneografiya, vaginografiya, phlebography, arteriography and lymphography pelvis and retroperitoneal space, X-rays of the skull, the adrenal glands.

1. Hysterosalpingography (MSG) - a radiological method isledovanija, allowing to determine the status of the uterus and fallopian tubes. MSG is carried out on 8-12 day of the menstrual cycle, for the diagnosis of CIN MSG - 23-24 days. A study carried out with X-ray contrasting solutions: liposoluble (lipidol), water-soluble (urogratin) and vodnoviskoznymi (polyvidone, medopak). Preparation of the patient includes: a survey to assess the general condition and exclusion of inflammation, intestinal cleansing and emptying of the bladder, the introduction of antispasmodics for 30 minutes. prior to the study. Perform 2 shots: 1 after the uterine cavity filling contrast agent, 2- after the new administration of contrast.

Indications: uterine infertility options, suspected tuberculosis, internal genitalia anomalies, monitor the effectiveness of plastic surgery on the uterus and tubes, tumors and uterine polyps, endometrial hyperplasia, suspected malignancy. Contra-indications: feverish conditions of different etiology, acute and subacute inflammatory processes, pregnancy, DMK, decompensated somatic diseases.

Complications: 1) early (reflux vascular, lymphatic reflux pipe rupture, perforation of the uterus, and allergic reactions); 2) recent (acute inflammation).

2. Pnevmoelviografiya - the second most common method of x-ray studies in gynecology, it is the introduction of air into the abdominal cavity and allows to define the contours of the uterus and ovaries. As contrast medium is used, nitrous oxide, carbon dioxide and oxygen. Indications: the need to obtain information about the external contours of the internal genitalia in individuals not sexually active, if pronounced scar or atrophic vaginal changes, adhesive process in the pelvis; ovarian tumors, and primary amenorrhea psevdogermofroditizm, dif.diagnostika uterus and appendages, genital tumors, uterine podbryushinnye nodes. Contraindications: acute and subacute vospolitelnye disease decompensation somatic pathology women. Complications: gas embolism, subcutaneous tissue emphysema, pneumothorax, intra-abdominal bleeding and a hematoma of the anterior abdominal wall.

3. X-ray examination of the skull is used for the diagnosis of neuroendocrine diseases. X-ray study of the shape, size, sella circuits are used for the diagnosis of pituitary tumors.

4. Computed tomography (CT) is based on the change in the intensity of x-ray radiation as it passes through different densities of tissue. Computed tomography provides a complete picture of the organ or the pathological focus, which explores quantitative information on the layer thickness and the nature of the lesion. With the help of computer tomography can obtain reflected longitudinal study area, rekonstruktirovat slice and get it in any plane. Currently, imaging region sella reveals small tumors located intrasellyarno and non-deformable wall of the sella. Radiation exposure during CT is lower than with other methods of x-ray studies.

Methods of functional diagnostics of ovarian condition.

To evaluate the functional state of the ovaries using cytological examination of vaginal smears, cervical mucus study of channel, measurement of basal body temperature.

1. Cytology vaginal smears based on the definition in these specific kinds of vaginal epithelium. Surface flat layered neorogovevayuschii vaginal epithelium -gormonozavisim is the target organ. When 2-phase ovulatory menstrual cycles in vaginal smear are found in different proportions superficial and intermediate epithelial cells. In the assessment of the proportion of the surface stratum and the total number of superficial cells based calculation kariopiknoticheskogo index (CPI). In the follicular phase of the normal menstrual cycle is 25-30% of the CPI, during ovulation - 60-70%, in the phase of development of the corpus luteum - 25-30%. With this! the method can determine the woman's hormonal background (estrogen deficiency, hyperandrogenism), hormone treatment to control, diagnose, and to justify hormone miscarriage in early pregnancy, to make selection OK DMK treatment, the premenstrual syndrome.

2. "Pupil Symptom" - the amount of mucous secretion in the cervical canal, reflects the production of estrogen by the ovaries. Based on the expansion of the external opening of c / channel and it appears in a transparent glassy mucus. Determined during the inspection w / uterus in the mirror, the external os resembles a zrachek. Symptom "pupil" depending on its degree is estimated at points (1.3): negative (-), weak positive (+), positive (++), rezkopolozhitelny (+++). The greatest amount of mucus is observed at the time of ovulation, the smallest - before menstruation. No symptoms of the pupil indicates a weak estrogenic effects, long rezkovyrazhenny symptom - of hyperestrogenism. The test gives an indication of the form of the MQM, premenstrual syndrome and other endocrine disorders. The test is not characteristic pathological changes of the cervix.

3. Symptom "fern leaf" is based on the crystallization of cervical mucus deposited on a glass slide. The crystallization of the mucus occurs in the presence of mucin by the action of estrogen, a symptom can be set between 7-20 day of a normal menstrual cycle, reaching its highest development at the time of ovulation, there is no before menstruation. Estimated in points (1-3): negative (-), weak positive (+), positive (++), zerkopolozhitelny (+++).

4. Symptom tension of cervical mucus - a simple and informative method of determining the body's estrogen saturation. Kortsangom take cervical mucus and by diluting the jaws define its elasticity (stretchability). Pulling mucus more than 6-8 cm. Evidence of sufficient estrogen saturation.

5. **The basal temperature test** is based on hyperthermal effects of progesterone on the thermoregulatory center. Change the basal body temperature (rectal morning) allows you to establish the presence, severity and duration of the progesterone phase. In the normal menstrual cycle, the basal temperature rises by 0.4-0.8 in the progesterone phase. Measuring basal body temperature is made within 2-3 months. With this test it is possible to judge about ovulation and anovulation, the shortening of the luteal phase, endometriosis corpus luteum function.

Laboratory diagnostics: oncocytopathology, bacterioscopy, bacteriology, ELISA, PCR, pathomorphological examination.

Along with common laboratory tests: general blood and urine tests, blood chemistry, blood test group and Rh factor, coagulation (determination of blood clotting), there are specific tests in gynecology, which include: analysis on TORCH-complex (identification of woman's blood antibodies to rubella, herpes, toxoplasma, cytomegalovirus and chlamydia), a hormonal screening, microbiological diagnostic methods, enzyme-linked immunosorbent blood analysis, polymerase chain reaction, a pregnancy test, a blood test for the presence of tumor markers.

Identification hormone concentration in the blood (hormonal screening)

This diagnostic method allows to identify endocrine pathology. Hormonal screening can reliably assess the nature of the basal secretion of steroid and tropic hormones in a woman's blood. In this study the level of hormone activity in the different phases of the menstrual cycle (study performed prolactin, gonadotropins (LH, FSH), testosterone, estradiol, cortisol, thyroid hormones (T3, T4), and many others).

Microbiological diagnostic methods

Microbiological examination reveals bacteria in the genital tract of women and thus set the etiological cause of the disease or condition. This method allows the diagnosis of infectious and inflammatory diseases of the female reproductive organs. Microbiological method bacteriological diagnosis has been rendered crops: a smear of vagina, uterine cervix, urine or blood are plated on a nutrient medium and grown colonies of microorganisms which are then examined under a microscope. This method also allows to identify the sensitivity of a pathogen to antibiotics and correctly, given the sensitivity of a microorganism to pick antimicrobial agent to treat the disease. Microbiological testing is the cheapest method of diagnosis, however, does not always provide accurate, objective results.

ELISA, or enzyme-linked immunosorbent blood test

Immunoassay blood is more accurate (compared with a microbiological method) research method. This method of diagnosis other than to identify the etiology of the pathogen can also identify the stage of pathological process (acute, subacute, chronic, reinfection, subsidence of the pathological process, the traumas of the inflammation process).

Polymerase chain reaction - PCR (or method of DNA-diagnostics)

PCR is the most accurate method of reliable diagnosis of infectious and inflammatory diseases (but also the most expensive). In carrying out this reaction from biological material (vaginal swab, urine, blood) being withdrawn microorganism DNA fragment. PCR has a high degree of diagnostic accuracy and detect a wide range of pathogens (protozoa, bacteria, fungi, viruses).

Pregnancy test

It is used for the diagnosis of pregnancy. It is based on the identification in the urine of pregnant women chorionic gonadotropin, which is produced by the embryo in the first weeks of pregnancy.

A blood test for the presence of tumor markers

This assay is non-specific, is appointed in cases of suspicion of the presence of ovarian cysts, malignant neoplasms of the female reproductive organs, therefore, it requires repeated repetition and additional diagnostic techniques.

Additional examination methods in gynecology.

Morphological (histologic) methods.

Biopsies obtained from the cervix, uterus, ovaries necessarily subject to histological examination. Material prepared by various gynecological operations.

1. Biopsy - vivo excision of a small piece of tissue for microscopic examination. Produce in pathological processes, suspected malignancy with in the area of the cervix, vagina, external genitals and take material by excision with a scalpel on the border of healthy tissue and the altered portion is collected in containers filled with formalin, labeled and sent for histological examination.

2. Split (fractional) diagnostic curettage of the mucous membrane of the cervix and uterine body channel produce to ascertain the condition of the mucous membrane in benign and malignant processes (cyclic changes, hyperplasia, precancerous changes, endometrial cancer, cervix). The operation is performed in a hospital under obzbolivaniem. Vnachale scrape mucous membrane of the cervical canal, then the body of the uterus. Scrapings are collected separately in receptacles with formalin, labeled and sent for histological examination.

3. Aspiration Biopsy is performed by Brown syringe in inpatient and outpatient. Get the endometrium of the uterus different departments (bottom corners). From the resulting material make smears on a slide. This method allows us to determine the state of the mucous membrane in benign and malignant processes (cyclic changes, hyperplasia, precancerous changes, endometrial cancer), to monitor the effectiveness of hormonal treatment.

4. Aspiration curettage performed a special hollow curette, connected to a vacuum pump. Aspiration method for the preparation of the endometrium has advantages over the uterine curettage due to less traumatization of the tissues and the ability to re-use during the menstrual tsikla. Danny method allows us to determine the state of the mucous membrane in benign and malignant processes (cyclic changes, hyperplasia, precancerous changes, endometrial cancer) monitor the effectiveness of hormonal treatment.

5. Puncture the abdominal cavity through the posterior vaginal fornix is carried out in order to generate content for the differential diagnosis of ectopic pregnancy and inflammation of the uterus, at break cystic abscess formation or breakout. If you suspect an ovarian cancer -for detection of atypical kletok. Prokol ascites produced in the center of the posterior fornix of the vagina to a depth of 2 cm. Thick needle.

6. Mandatory histological examination of organs and tissues removed during surgery (uterus, appendages, fibroids, part of the resected ovarian ovarian cyst shell, oil seal, etc.) In order to verify the diagnosis, determine the extent of surgical treatment, the appointment of pathogenetic therapy.

Materials of student activization during lecture:

Questions:

1. Specifics of anamnesis gathering in gynecological patients?
2. What special examination methods in gynecology do you know?
3. What is colposcopy and how is it performed?
4. What laboratory methods in gynecology do you know?
5. What endoscopic methods in gynecology do you know?
6. What concerns the external genital organs of a woman?
7. What internal genital organs of a woman do you know?

General material and methodological support of the lecture:

Study Room: Lecture Room.

Equipment: classroom.

Equipment: multimedia projector, screen.

Illustrative material: slides, tables.

LIST OF RECOMMENDED EDUCATIONAL LITERATURE

Basic:

1. Zaporozhan V.M., Miwenko V.P. Collection of test tasks for clinical paints: science-medical collection. - Odessa: Odessa state medical university, 2008.- 176 p.s- Language: eng.
2. The Linde's operative gynecology - John A.Rock, 2003
3. Oxford Handbook of Obstetrics and Gynaecology by S. Collins , S. Arulkumaran , K. Hayes , S. Jackson , L. Impey, Oxford University Press, 3rd Edition, 2013
4. Handbook of Gynecology Shoupe, MD, MBA, Donna (Ed.), Springer, 2017
5. Gunner Goggles Obstetrics and Gynecology, Edition 1, By Hao-Hua Wu, Leo Wang, 06 Oct 2018
6. Beckmann and Ling's Obstetrics and Gynecology, Eighth, North American Edition, Dr.Robert Casanova, May 3, 2018 Beckmann and Ling's Obstetrics and Gynecology, Eighth, North American Edition, Dr.Robert Casanova, May 3, 2018
7. Essential Obstetrics and Gynaecology (4th Edition) - E. Malcolm Symonds, Ian M. Symonds , 2008
8. BENSON & PERNOLL'S handbook of OBSTETRICS & GYNECOLOGY,2008
9. Operative gynecology /D.M. Gershenson, A.H. DeCherny, S.L. Curry, L. Brubaker. – second ed. - W.B. Saunders company, 2001.-890p.
10. Robboy S.J. Anderson M.C., Russel P. Pathology of the female reproductive tract. – Churchill Livingstone, 2002.- 929 p.
11. Gynecology: підручник англійською мовою (edit by I.B. Ventskivska).- K.: Medicine,2010.-160 p.

Additional:

12. Progress in Obstetrics and Gynaecology. Vol 10. Ed J Studd. (pounds sterling 26.50.) Churchill Livingstone, 1993. ISBN 0443-04754-5.
13. Recent Advances in Obstetrics and Gynaecology. Vols 16 and 17. Ed J Bonnar. (pounds sterling 22.50.) Churchill Livingstone, 1993. ISBN 0-443-04402-3.