Ministry of Public Heals Service of Ukraine
«Ukrainian Medical Stomatological Academy»

«APPROVING»
on the sitting of chair of obstetrics and
gynecology №1 of HSEEU “UMSA”
(protocol № 1 from 28. 08. 2019)

Acting manager of chair of obstetric and
gynecology №1
professor [Signature] A.M. Gromova

METHODOICAL POINTING
for the independent work of students for preparation to practical lesson

<table>
<thead>
<tr>
<th>Educational subject</th>
<th>Gyneceology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modul №</td>
<td>1</td>
</tr>
<tr>
<td>Subject of lesson</td>
<td>Clinical anatomy and physiology of women’s reproductive organs.</td>
</tr>
<tr>
<td>Course</td>
<td>IV</td>
</tr>
<tr>
<td>faculty</td>
<td>Foreign students training faculty (medical)</td>
</tr>
</tbody>
</table>

Poltava – 2019
Clinical anatomy and physiology of women’s reproductive organs.

1. Rationale: clinical anatomy of the genitals has a great value for studying gynecology. The structure of external and internal genitals, their blood supply enables to understand pathogenesis of gynecologic diseases. The topic includes the learning of: anatomy of external genitalia, vagina, uterus and its parts, uterus function, ovaries and their function. Suspensory ligaments of the uterus. Blood supply and lymphatic system. Physiological changes in female reproductive organs at different ages. Modern knowledge about the menstrual function. Neuroendocrinological regulation of the female reproductive system function. Role of hormones and biological active substances.

2. Objectives:
- To analyze clinical aspects of the normal anatomy of the female genital organs
- To explain the pathogenesis of the development of the pathology, taking into account the anatomical and morphological and physiological features of the female genital organs.
- To suggest clinical aspects of the normal anatomy of the female genital organs
- To classify options for the normal and abnormal location of the internal genital organs
- To interpret features of blood supply and innervation of the external and internal genital organs
- To draw a diagram schema of blood supply to the female genital organs
- To make the analysis of supporting, fixing and suspending the ligamentous apparatus of the uterus
- To make up the models pelvic organs in the form of a picture

3. The basic level of expertise, skills, abilities, required for learning the topic (interdisciplinary integration)

<table>
<thead>
<tr>
<th>The name of the previous disciplines</th>
<th>Acquired skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>Histology</td>
<td>Histological structure of the cervix, vulva and endometrium in normal and in pathological conditions.</td>
</tr>
<tr>
<td>Normal Physiology</td>
<td>Physiological changes occurring in the hypothalamic-pituitary-ovarian system of women and target organs of the sex hormones action at different ages.</td>
</tr>
<tr>
<td>Microbiology, Immunology</td>
<td>Specific and nonspecific protective factors of FRS, antiviral immunity</td>
</tr>
<tr>
<td>--------------------------</td>
<td>---------------------------------------------------------------------</td>
</tr>
<tr>
<td>Pathological Anatomy</td>
<td>Hormonal changes in the body during the menstrual cycle and disorders of the microbiota of the female reproductive system.</td>
</tr>
<tr>
<td>Operative Surgery</td>
<td>The main types of surgery on the female genital organs. Mechanisms of therapeutic action of physical factors (electric current, refrigerants, laser radiation, phototherapy).</td>
</tr>
</tbody>
</table>

### 4. Tasks for independent work in preparation for the lesson and in class.

4.1. The list of the basic terms, parameters, characteristics which the student should master at preparation for employment:

<table>
<thead>
<tr>
<th>The term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>External female genital organs.</strong></td>
<td>Mons pubis, labia majora, labia minora, clitoris, Bartholin’s gland, perineum.</td>
</tr>
<tr>
<td><strong>Internal female genital organs.</strong></td>
<td>Vagina, uterus, fallopian tubes and ovaries.</td>
</tr>
<tr>
<td><strong>Blood supply of the genital organs.</strong></td>
<td>a.pudenda interna, a.spermatica externa a.pudenda interna and a.rectalis media. a.iliaca interna, a.iliaca interna (uterine artery), a.pudenda externa, a.obturatoria</td>
</tr>
<tr>
<td><strong>Suspensive, fixative and supportive apparatus of the uterus.</strong></td>
<td>lig.latum uteri lig.teres uteri lig. ovarii proprium Suspensorium ovarii the excavatio vesicouterina the excavation rectouterina</td>
</tr>
<tr>
<td><strong>Innervation of female genital organs</strong></td>
<td>1. Pudendal nerve. 2. Ilio-inguinal nerve (L1): supplies the skin of mons pubis. 3. Genital branch of genitor-femoral nerve (L1, L2): supplies anterior parts of labia. 4. Perineal branch of posterior cutaneous nerve of the thigh: anterior part of labia perineum.</td>
</tr>
</tbody>
</table>
The location of the uterus in the small pelvis

- anteflexio
- retroflexio
- sinistraposition
- dextraposition of uterus

Histological structure of internal FRS

- The layers of the uterus (endometrium, myometrium, perimetrium)

### 4.2 Theoretical questions for the lesson:

1. What is the soft part of birth canal?
2. What are the anatomic portions of the uterus?
3. Describe the position of the uterus in the pelvis.
4. What are the histological layers of the uterine wall (from interior to exterior)?
5. What ligaments support the uterine position in the pelvis?
6. What are the major blood supplies to the uterus?
7. Describe the position of the vagina in the pelvis.
8. What is the major blood supply to the pelvic organs?
9. Name the ligamentous structures in the pelvis. Describe each.
10. What is the urogenital diaphragm?
11. Name the muscles of the urogenital diaphragm.

### 4.3 Practical activities (tasks) to be performed on the lesson:

- To perform gynecological examination (bivalve vaginal speculum, bimanual, rectal, rectovaginal).
- To collect a specific gynecological anamnesis, to evaluate the findings of laboratory tests.
- To collect material from the vagina, cervix, cervical canal and urethra for cytological, and bacterioscopic studies.
- To evaluate the findings of cytological, histological, virological and bacteriological studies.
- To evaluate the findings of the ultrasonography of organs of the small pelvis.
- To estimate the protocol of the colposcopy of the cervix and vulva.
- To make a plan of examination of a patient in various nosological forms of background and precancerous pathology.

### 4.4 Topic content
Clinical anatomy and physiology of female reproductive system.

The external genitalia include: pudendal cleft, mons pubis, labia majora, labi minora, clitoris, Bartholin’s gland. Internal genitalia include: vagina, uterus, fallopian tubes and ovaries.

The perineum consists of muscles, that may be divided into 3 layers.

- The 1st or superficial layer consists of m. m. ischiocavernosus, m. bulbocavernosus, m. constrictor cuni, m. sphincter ani externum, m. transversus perinei superficialis.
- The 2nd layer is called diaphragm urogenitale consists of m. sphincter urethrae, m. transversus perinei profundus.
- The 3rd, inner layer is called diaphragm pelvis consists of m. levator ani, that has three parts - m.pubococcygeus, m.ischiococcygeus, m.ileococcygeus
Mons pubis. Is formed by the prominent parts of the tubercles of the pubis bones with well developed subcutaneous adipose tissue and hairy part in the shape of triangle (the female type of hair distribution).

Labia majora. The two thick cutaneous creases with very well developed subcutaneous fat tissue. The external part is covered with hair, the inner part contain sweat and sebaceous glands.

Labia minora. Cutaneous creases, that are similar to mucosa layer. In front they proceed into clitoris, from behind they join with labia majora. Labia minora do not have hair, neither sweat, nor mucosa glands. They are covered with stratified squamous epithelium.

Bartholin’s glands are two pea sized compound racemose glands located slightly posterior and to the left and right of the opening of the vagina, they secrete mucus to lubricate the vagina, their duct length is 1.5 to 2.0 cm and open into navicular fossa. Inflammation of these glands can be caused by but not limited to gonorrhoeal and chlamidal infections and is called bartilinitis.

Clitoris. In humans, the visible button-like portion is near the front junction of the labia minora, above the opening of the urethra, the clitoris is the human female's most sensitive erogenous zone and generally the primary anatomical source of human female sexual pleasure, is comparable to the penis in males.

![Anatomy of the female pelvic organs](image)

Vagina. The vagina is an elastic, muscular tube that connects the cervix of the uterus to the exterior of the body. It is located inferior to the uterus and posterior to the urinary bladder. At the vulva, the vaginal orifice may be partly covered by a membrane called the hymen, while, at the deep end, the cervix bulges through the anterior wall of the vagina. The wall of the vagina from the lumen outwards consists firstly of a mucosa of non-keratinized stratified squamous epithelium with
an underlying lamina propria of connective tissue, secondly a layer of smooth muscle with bundles of circular fibers internal to longitudinal fibers, and thirdly an outer layer of connective tissue called the adventitia. The mucosa forms folds or rugae, which are more prominent in the caudal third of the vagina; they appear as transverse ridges and their function is to provide the vagina with increased surface area for extension and stretching. Where the vaginal lumen surrounds the cervix of the uterus, it is divided into four continuous regions or vaginal fornices; these are the anterior, posterior, right lateral, and left lateral fornices. The posterior fornix is deeper than the anterior fornix. The functions are: serves as the birth canal, is the place where semen from the male penis is deposited into the female's body at the climax of sexual intercourse, a phenomenon commonly known as ejaculation, during menstruation, the menstrual flow exits the body via the vagina.

Uterus. Is a pear-shaped muscular organ 7.6 cm long, 4.5 cm broad (side to side) and 3.0 cm thick (anteroposterior). The uterus is divided into 4 parts: the fundus, corpus, cervix and the internal os. From outside to inside, the path to the uterus is as follows: cervix uteri, external orifice of the uterus (external os), cervical canal, internal os, cavity of the uterus body, fundus of the uterus. The lower end of the cervix bulges into the anterior wall of the vagina, and is referred to as the vaginal portion of cervix (or ectocervix), the rest of the cervix above the vagina is called the supravaginal portion of cervix. The mucosa lining the cervical canal is known as the endocervix and the mucosa covering the ectocervix is known as the exocervix. Vaginal portio of the uterus as the mucosa layer of the vagina are covered with squamous epithelium. The mucosa layer of the cervical canal is covered by one layer of cylindrical ciliary epithelium, contain a lot of glands, that produce thick mucous. The external os in the nulipara woman has a round shape, in multipara – a shape of a transverse cleft. Is divides the cervix into two lips – anterior and posterior.

The layers of the uterus are:

- **endometrium** - is covered by ciliary cylindrical epithelium with a bi gamount of glands, that are too covered with cylindrical epithelium. Endometrium consists of two layers: superficial or functional – that changes depending of the phase of the menstrual cycle, and profound or basal – that is closely adjacent to the basal membrane and does not change during menstrual cycle.

- **Myometrium** – it consists of three layers of muscles – external and internal longitudinal and middle – circular, that is most prominent.

- **Perimetrium** – serous layer – is the visceral fold of the peritoneum. The uterus body is covered with peritoneum, that in the front covers the bladder as a crease and covers the excavatio vesicouterina. Behind the uterus, the peritoneum covers the rectum and forms the excavation rectouterina. Lateraly of the uterus, the two layers of the peritoneum are called the wide ligament of the uterus and pass to the lateral pelvic wall.

The uterus has three suspensory ligaments: lig.latum uteri (formed as a double fold of the peritoneum) , lig.teres uteri (that goes from the horn of the uterus
and passes into the inguinal canal), lig. ovarii proprium (connects the uterus end of the ovary with the uterus) and lig. Suspensorium ovarii (is the most movable part of the lig.latum uteri).

Fig.1.2. Anatomy of the female internal genitalia

Uterus function - The uterus is essential in sexual response by directing blood flow to the pelvis and to the external genitalia, including the ovaries, vagina, labia, and clitoris, the reproductive function of the uterus is to accept a fertilized ovum which passes through the uretro-tubal junction from the fallopian tube, the visceral muscles of the uterus contract during childbirth to push the fetus through the birth canal.

Uterus appendages include fallopian tubes and ovaries.

Fallopian tube. It passes in the broad ligament of the uterus. The length is 10-12 cm. It has to orifices – uterus and abdominal. The fallopian tube is divided into 4 parts: the infundibulum with its associated fimbriae near the ovaries, the ampillary region that represents the major portion of the lateral tube, the isthmus which is the narrower part of the tube that links to the uterus, and the interstitial (also known as intramural) part that transverses the uterine musculature. The fallopian tube is contracted by peristalsis movements from the ampullary part to the uterus. The wall of the tube consists of three layers: mucous membrane, that is the
continuation of the mucous membrane of the uterus body, the muscular layer, formed by two layers of muscles (internal circular and external longitudinal) and serous (peritoneum).

**Ovary.** Is a pair gonad approximately 3 cm long and 2 cm wide and 1.5 cm thick. The end to which the fallopian tube attaches is called the *tubal extremity* and ovary is connected to it by infundibulopelvic ligament. The other extremity is called the *uterine extremity*. It points downward, and it is attached to the uterus via the ovarian ligament. The ovaries lie within the pelvic cavity, on either side of the uterus, to which they are attached via a fibrous cord called the ovarian ligament. The ovaries are uncovered in the peritoneal cavity but are tethered to the body wall via the suspensory ligament of the ovary. The part of the broad ligament of the uterus that covers the ovary is known as the mesovarium. The ovary is thus considered an intraperitoneal organ. The ovary consists of flat epithelial cells that originate from surface epithelium covering the ovary, granulosa cells - surrounding follicular cells have changed from flat to cuboidal and proliferated to produce a stratified epithelium, gametes, the outermost layer is called the germinal epithelium. The ovarian cortex consists of ovarian follicles and stroma in between them. Included in the follicles are the cumulus oophorus, membrana granulosa (and the granulosa cells inside it), corona radiata, zona pellucida, and primary oocyte. The zona pellucida, theca of follicle, antrum and liquor folliculi are also contained in the follicle. Also in the cortex is the corpus luteum derived from the follicles. The innermost layer is the ovarian medulla. It can be hard to distinguish between the cortex and medulla, but follicles are usually not found in the medulla. The ovary also contains blood vessels and lymphatics. Basic functions of the ovary are: production of hormones (estrogen, testosterone and progesterone) and ovarian aging.

**Blood supply of the female genitalia:**

- The external genitalia are supplied with blood from a.pudenda interna (that is a branch of a.iliaca interna), a.pudenda externa, a.obturatoria (a branch of a.iliaca interna) and a.spermatica externa (a branch of a.iliaca externa). Identically named veins go in parallel with the arteries.

- The internal genitalia are supplied from the vessels that come directly from the aorta (ovarian artery) and from the a.iliaca interna (uterine artery). The uterus is supplied with blood from the a.uterina and partially from a.ovarica. A. Uterina supplies blood to uterus, broad ligament of the uterus, round ligaments of the uterus, fallopian tubes, ovaries and vagina. But mainly, the blood supply of the ovaries and fallopian tubes is carried out by a. ovarica. The upper part of the vagina is supplied with blood from the descending branches of the uterine artery, the middle part by the vaginal branches of a.vesicalis inferior and the lower part by the branches of the a.pudenda interna and a.rectalis media.
Fig. 1.3. Blood supply of the female genitalia

The lymphatic system of the female genitalia is a wide range of lymphatic vessels and nodes. There are profound and superficial inguinal, internal and external iliac, sacrum and paraaortic lymphatic nodes and the lymphatic nodes of the obturator foramen. From the external genitalia and the lower part of the vagina the lymph passes into the inguinal lymphatic nodes, partially there comes the lymph from the nodes of the uterus fundus. From the upper part of the vagina, cervix and lower part of the uterus, the lymph passes through the vessels into the sacrum, obturator, internal and external iliac lymphatic nodes. From the upper part of the uterus, fallopian tubes and ovaries the lymph is collected into the lumbar lymphatic nodes.

The innervation of the internal genitalia is carried by the sympathetic and parasympathetic part of the autonomic nervous system. The bigger part of the nerves that go to the uterus are sympathetic, the branches of n. vagus, n. phrenicus, rami communicantes of the sacrum plexus are joined with them. The uterus body is innervated mainly by the sympathetic nervous system. The isthmus of the uterus is innervated by the pelvic plexus, the cervix mainly is innervated by the parasympathetic nerves, that pass from the uterus-vaginal plexus. The ovaries are innervated by the ovarian plexus. The branches of n. pudendus come up to the external genitalia. The fallopian tubes are innervated partially from the ovarian plexus, partially from the uterus-vaginal.
**Soft part of birth canal** is uterus, cervix, vagina and muscular and fascial system of pelvic floor.

The uterus (or womb) is the major female reproductive organ. On one end there is the cervix, which opens into the vagina; and on the other it is connected both sides to the fallopian tubes. The uterus is located inside the pelvis and is dorsal to the urinary bladder and ventral to the rectum. The uterus has thick, muscular walls and is very small. When woman is not pregnant, its size is several centimeters in diameter. In a nulliparous woman, the uterus is only about 7 cm long and 4 to 5 cm wide, but it can expand to the size of a 4 kg baby. From outside to inside, there are following uterus parts:

- **Cervix uteri** - "neck of uterus":
  - Canal of the cervix
  - External and internal orifice of the cervix
- Isthmus of uterus
- **Corpus uteri** - "Body of uterus":
  - Cavity of the body of the uterus
  - Fundus of uterus.

The end of the uterus is called the cervix. Longitudinal size of cervix is about 2.5 cm. External and internal orifice of the cervix is closed. Before labor cervix becomes shorter and orifice of the cervix begins open.

The cervix secretes mucus, which consistency varies with the stages of menstrual cycle. This cervical mucus is clear, runny and conducive to sperm at ovulation time.

The wall of uterus consists of 4 layers. The layers of uterus, from inside to outside, are as follow.

- **Endometrium.** The lining of the uterine cavity is called "endometrium". It is a mucous lining, which consists of lamina propria and superficial. The endometrium builds a lining periodically which, if no pregnant occurs, is shed or reabsorbed. Shedding of the endometrial lining in humans is responsible for menstrual bleeding (known colloquially as a woman's "period") throughout the fertile years of a female and some time beyond. During pregnancy endometrium changes to the deciduas. Its
major function is to accept a fertilized ovum which becomes implanted into the endometrium, and derives nourishment from blood vessels which develop exclusively for this purpose in endometrium. The fertilized ovum becomes an embryo, develops into a fetus and gestates until childbirth.

Myometrium. The uterus mostly consists of smooth muscle known as "myometrium". The muscular fibres of miometrium have 3 distinct directions: outer longitudinal, middle interlacing and inner circular.

Perimetrium. This is serous coat, which covers the entire organs except on the lateral borders. The uterus is surrounded by peritoneum.

Uterus is held in place by several peritoneal ligaments. They are divided into suspending, immobilizing and supporting structures. The suspending structure of interna genitalia comprises the following:

<table>
<thead>
<tr>
<th>Name</th>
<th>From</th>
<th>To</th>
</tr>
</thead>
<tbody>
<tr>
<td>Broad ligament of the uterus (mesometrium)</td>
<td>the sides of the uterus</td>
<td>the walls and pelvic floor</td>
</tr>
<tr>
<td>Round ligament of uterus</td>
<td>lateral angle of the uterus (uterine horns)</td>
<td>labium majus</td>
</tr>
<tr>
<td>Ovarian ligament (or &quot;proper ovarian ligament&quot;)</td>
<td>lateral surface of uterus</td>
<td>ovaries</td>
</tr>
<tr>
<td>Uterosacral ligaments</td>
<td>posterior surface of uterus (point where isthmus transforms into cervix)</td>
<td>Anterior surface of the sacrum</td>
</tr>
</tbody>
</table>

Immobilizing system comprises: Cardinal ligaments and Uterosacral ligaments. Supporting system comprises: muscles and fascies of pelvis floor (see below)
Vagina is the **tubular** tract leading from the **uterus** to the exterior. The **human** vagina is an elastic muscular canal that extends from the **cervix** to the **vulva**. Although there is a wide anatomical variation the average vagina is 15 to 18 cm in length; its elasticity allows it to stretch during **sexual intercourse** and during **labor** and delivery. The vagina connects the vulva (which is outside the body) to the cervix of the **uterus** (which is inside the body). If the woman stands upright, the vaginal tube points in an upward-backward direction and forms an **angle** of slightly more than 45 degrees with the uterus. The vaginal opening is at the back (**caudal**) end of the vulva, behind the opening of the **urethra**. **Vaginal lubrication** is provided by the **Bartholin's glands** near the vaginal opening and the cervix. The membrane of the vaginal wall also produces moisture, although it does not contain any glands. Before and during **ovulation**, the **cervix** produces cervical **mucus**, which provides a favorable environment for **sperm** to survive.

There are an anterior, posterior, and 2 lateral walls of the vagina. The part of its cavity around the cervix is called fornix. There are 4 fornices: an anterior, posterior, and 2 lateral ones.

**During childbirth**, the vagina provides the route to deliver the baby from the **uterus** to outside the body of the mother. During birth, the vagina is often referred to
as the birth canal. The vagina is remarkably elastic and stretches to many times its normal diameter during vaginal birth.

Ending part of birth canal is external reproductive organs end perineum. *External genatalia* include such organs, as: Labia majora and minora, Clitoris, Vestibule, Perineum.

![Figure 2. Anatomy of external reproductive organs.](image)

Unlike the male, the female has separate opening for the urinary tract and reproductive system. These openings are covered externally by two sets of skin folds. The thinner, inner folds are the *labia minora* and the thicker, outer ones are the labia majora. The labia majora are covered with squamous epithelium and contain sebaceous glands, sweat glands and hair follicles.

The labia minora are two thin folds of skin, devoid of fat, on either side just within labia majora. Antheriorly they are united with each other in front and behind clitoris. The lower portion of the *labia minora* fuses across the mildline to form a fold of skin known as fourchette. The labia minora contain connective tissues, numerous sebaceous glands, numerous vessels and nerve endings and also erectile tissue, like that in the penis, thus it change shape when the woman is sexually aroused.

*Clitoris.* It is a small cylindrical erectile body, situated in the most anterior part of the vulva, at the anterior end of the labia, under the pubic bone. It consists of glands, a body and two crura. The glands are covered with squamous epithelium and are very supplied with nerves and vessels. The vessels of clitoris are connected with the vestibular bulb and are liable to be injured during childbirth.
The opening around the genital area is called the *vestibule*. It is triangular space bounded anteriorly by the clitoris, posteriorly by the fourchette and on either side by the labia minora. There are 4 openings into vestibule:

1. uterine opening
2. paraurethral ducts
3. vaginal orifice and hymen
4. opening of Bartholin’s ducts

There are two Bartholin’s glands, one on each side. They are situated in the superficial perineal pouch, close to the posterior end of vestibular bulb. They are pea-sized and yellowish white in colour. Each glands has got a duct which measures about 2 cm long and opens into the vestibule outside the hymen at the junction of anterior two thirds and posterior one third in the groove between the hymen and the labius minus.

*Hymen* is membrane that partially covers the opening of the vagina. This is torn by the woman’s first sexual intercourse (or sometimes other causes like injury). In women, the openings of the vagina and urethra are susceptible to bacterial infections.

*Perineum*. It is divided into anatomical and obstetrical perineum. *Anatomical perineum* is bounded above by the inferior surface of pelvic floor, below by skin between the buttocks and thighs. Laterally it is bounded by the ischiopubic rami, ischial tuberosities and sacrotuberous ligaments. Posteriorly it is bounded by coccyx. The perineum is divided into 2 triangular spaces: anterior (urogenital triangle) and posterior (anal triangle).
Figure 3. The musculofascial structures of peritneum. 1 – muscles ishiaspongiosus; 2 – urogenital diaphragm; 3 – muscles bulbospongiousus; 4 - muscles transverse perineum superficiales; 5 – muscles obturatoria interna; 6 – rectum; 7 - sphincter ani externus; 8 – piriforis muscles; 9 – pubococcygeuc muscles (legamentum)

**Obstetric perineum** is pyramidshaped tissue between commissural labial posterior and anal canal. It measure about 4x4 cm. The base is covered with perineal skin and the apex is pointed and continues with retrovaginal septum.

**Fasciae:** Superficial perineal fasciae (2 layer), Inferior and Superior layer of urogenital diaphragm. Together they are called triangular ligaments.

**Muscles:** Superficial and Deep transverse perineum; Bulbospongiousus; Levator any; Sphincter ani externus (see Figure 3).

**Blood supply of perineum.**

Arteries:  - branches of internal pudental artery:

- labial
- transverse perineal
- artery of vestibular bulb
- deep and dorsal arteries to the clitoris
- branches of femoral artery:
superficiale and deep external pudendal

Veins: internal pudendal vein, vaginal venous plexus, long saphenous vein.

**Somatic genital tract nerve supply:**
1. Pudendal nerve.
2. Ilio-inguinal nerve (L1): supplies the skin of mons pubis.
3. Genital branch of genitor-femoral nerve (L1, L2): supplies anterior parts of labia.
4. Perineal branch of posterior cutaneous nerve of the thigh: anterior part of labia & perineum.

1) Pudendal nerve

**Origin:** S2, 3, 4 segments.

**Course:** as internal pudendal artery.

**Branches:**
- at its beginning: inferior hemorrhoidal nerve.
- at its ending: 2 terminal branches: perineal nerve. Dorsal nerve of the clitoris.

**Functions:**
A. Sensory to:
   1) Skin of vulva & clitoris.
   2) External urethral meatus.
   3) Lower vagina.
   4) **Perineum**.
B. Motor to:
   1) Levator ani muscle.
   2) Compressor urethra.
   3) Vaginal sphincter.
   4) External anal sphincter.

**Applied anatomy:**
- Pudendal nerve block: injection of local anesthesia transvaginally around the nerve at the level of ischial spine, used to anaesthetize perineum.

**B. Autonomic genital tract nerve supply:**
2. Parasympathetic plexus: S (2,3,4).
3. Ovarian plexus: T (10,11,12).
Genital tract nerve supply

1) Sympathetic

**Origin:** motor: T5,6
sensory: T10,11,12 L1

**Course:**
1) Presacral nerve (superior hypogastric plexus):
   - Formed from fibers from celiac plexus & lateral sympathetic chain.
   - Found in front of sacral promontory.
   - Gives 2 hypogastric nerves & join inferior hypogastric plexus.
2) Lee-frankenhauser plexus: supplies all pelvic organs, but not supply endometrium.

2) Parasympathetic

**Origin:** S2, 3, 4

**Course:** it joins inferior hypogastric plexus.
it supplies uterus, vagina UB.

**Action:** stimulates contraction & retraction of the body of the uterus.
stimulates relaxation of cervix.
stimulates evacuation of UB.

4) Ovarian plexus

**Origin:** it arises from pre-aortic plexus.
T10, 11, 12 segments.

**Course:** contains sympathetic & parasympathetic fibers.

**Action:** sensory.
Motor to ovaries, tubes fundus of the uterus.
7. Materials for self-control:

TESTS

1. The blood supply of the fallopian tubes is from:
   A. the ovarian and uterine arteries
   B. the ovarian arteries
   C. the uterine arteries
   D. the tubal arteries
   E. the rectum arteries

2. Which one of the following are external genital organ:
   A. major labia
   B. minor labia
   C. all answers are correct
   D. Bartholin glands
   E. clitoris

3. Which of the following doesn’t supply the uterus?
   A. uterine artery
   B. vaginal artery
   C. ovarian artery
   D. all above
   E. nothing above

4. Before puberty, the ratio of the length of the body of the uterus to the length of the cervix is approximately:
   A. 2:1
   B. 3:1
   C. 4:1
   D. 1:1
   E. nothing above

5. What part of the ovary comes to contain the developing follicles?
   A. medulla
   B. inner par
   C. membrane
   D. nothing above
   E. cortex

6. The fallopian tubes consist of:
   A. all answers are correct
   B. isthmus
   C. ampulla
   D. infundibulum
   E. ampulla and infundibulum

7. The wall of the uterus consists of:
   A. serous membrane and myometrium
   B. endometrium and myometrium
   C. endometrium and perimetrium
   D. perimetrium, myometrium, endometrium
8. What is the narrowest part of uterine tube?
   A. **isthmus**
   B. ampulla
   C. infundibulum
   D. all above
   E. ampulla and infundibulum

9. The Wolfian duct in the female:
   A. **regresses and becomes vestigial**
   B. develops into the fallopian tube
   C. forms the ovary
   D. forms the round ligament
   E. none of the above

10. The function of round ligament is:
    A. vestigial with no apparent function
    B. to prevent retrodisplacement of the uterus
    C. to prevent uterine prolapse
    D. to provide nerve supply of the upper vagina
    E. none of the above

**SITUATIONAL TASKS**

1. A patient of 14 years old complains of heaviness and pain in the lower abdomen, intensified. For the first time such sensations have appeared 3 months ago. Body height 155 cm., weight 40 kg. The sexual formula — A□2 P2 Ma2 Me0. At exam of the external genitalia the diverticulum of the hymen with dark contents of the vagina is revealed. What anomaly of generative organs is meant?

2. A 14-year old girl with algodismenorrhoea according to ultrasound data was established the diagnosis: an additional functioning uterine horn with infringement of outflow. The method of treatment:

3. A girl of 13 years old complains of abdominal pain with an interval of 24–30 days that is accompanied by vomiting, subfebrile temperature. At intubation of the vagina the probe passes only 1 cm. Ultrasound reveals a tumour-like mass outside from the rectum. The diagnosis:

4. A woman of 24 years old complains of abdominal pain between menstruations, algodismenorrhoea, constipations. In anamnesis — chronic inflammatory disease of genitalia, spontaneous abortion. At bimanual examination — retrodeviation of the uterus. Normal enforced replacement of the uterus is impossible. What is the most adequate procedure to conduct differential diagnosing:
5. A patient of 55 years old has addressed to the gynaecologist with complaints of constant nagging pain in the lower abdomen, difficulty of urination. In the anamnesis one labor with a large fetus which has become complicated by perineal rupture of II degree. The somatic anamnesis is not burdened. Postmeno-pause lasts for 4 years. The gynaecologic status: there are disjointed pedicles of the muscles lifting the anus; at staining effort outside the vulvar ring the uterus is defined, elongated and hypertrophic cervix. The anterior and posterior walls of the vagina are low- ered. The diagnosis:

List of recommended literature

Main

Addition

On-line resources
UMSA Academy website http://www.umsa.edu.ua/
Website of the Department of Obstetrics and Gynecology № 1 http://www.umsa.edu.ua/kafhome/kaf_akushgenikology_1/kaf_akushginecology.html
Videos
UMSA library website https://biblumsa.blogspot.com/

Methodical guidelines have been drawn up by CMedS As. Professor Krutikova E. I.

Revised, supplemented, reapproved at the meeting of the department number 1 of 28/08/2020
head of the department professor A.M. Gromova