



MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE
ODESSA STATE AGRARIAN UNIVERSITY
Faculty of veterinary medicine
Department of Surgery, Obstetrics and Small Animal Diseases



**METHODOLOGICAL RECOMMENDATIONS
FOR LABORATORY CLASSES
IN THE EDUCATIONAL COMPONENT
OBSTETRICS, GYNECOLOGY AND BIOTECHNOLOGY OF ANIMAL
REPRODUCTION
for full-time students
of the second (master's) level of higher education, specialty
211 «Veterinary medicine»**

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Methodological recommendations for laboratory classes in the educational component obstetrics, gynecology and biotechnology of animal reproduction for full-time students of the second (master's) level of higher education, specialty 211 veterinary medicine / L.G. Roman. [Electronic resource] – Odesa.: ODAU, 2026 . – 1 electronic optical disk (CD-ROM); 12 cm. 29 p.

Methodological recommendations for laboratory classes in the educational component obstetrics, gynecology and biotechnology of animal reproduction contains systematized material necessary for the formation of fundamental knowledge among higher education students about the the role gynelological diseases, their impact on the reproductive ability of fertile females. The classification of gynelological diseases, their etiology, clinical signs and diagnostic and therapeutic algorithm for monitoring gynecological diseases, chronic gynecological diseases of inflammatory (specific and nonspecific) and dysfunctional origin are considered in detail. The summary includes the description of the main scheme of treatment, features of the use of antibiotics, anti-inflammatory, hormonal drugs in veterinary gynecology. The material will be useful for higher education students in the specialty **211 "Veterinary Medicine"**.

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Safety and labor protection

Training specialists for the agricultural sector of the economy in the field of "Veterinary Medicine" involves studying not only theoretical material, but also conducting meaningful practical classes with students using active forms of learning, which will contribute to their perseverance in developing skills and forming professional thinking.

«The obstetrics, gynecology and reproductive biotechnology» is a clinical educational component that studies methods of transplantation of emdriions, artificial insemination, physiological and pathological changes in the organism of females and males that cause infertility.

Only students who have completed introductory and primary instruction under the guidance of a teacher or specialist are allowed to work. Always use special clothing: a gown or overalls, rubber or latex gloves, aprons and comfortable closed shoes.

Sterility: Do not touch the face, mucous membranes and open areas of skin with dirty hands or tools when working with products or waste.

Safety when working with live animals **Calm:** Work calmly, avoid sudden movements, loud screams and aggression. Animals react sharply to noise. **Distance and approach:** Do not approach the animal from behind without warning (with a voice). Do not enter close pens with large livestock without escape routes. **Restraint:** Use special restraints (slings, splints) during examination, treatment or milking.

Prohibited actions: Do not irritate animals, do not frighten them or disturb them while they are sleeping or eating - this may provoke an attack. **Safety when working with raw materials (meat, milk, wool, etc.)** **Quality assessment:** Work only with products that have passed veterinary and sanitary examination.

Infection prevention: Remember the risk of zoonotic infections (e.g. brucellosis, anthrax). Avoid contact of unprotected skin with biological fluids (blood, pus). **Heat treatment:** Any manipulations with raw meat or milk are carried out with mandatory subsequent disinfection of surfaces and washing hands with soap.

Actions in dangerous situations **Bites and injuries:** If an animal has bitten, scratched, or if a cut occurs while working with biomaterials, immediately wash the wound with soap and water, treat with an antiseptic, and contact a medical center or teacher.

Aggressive behavior: In the event of a sharp manifestation of aggression from an animal, do not try to calm it down yourself - use protective portable shields or call the practice manager for help.

The surrounding environment should be calm. At this time, there should be no strangers nearby. Handling the animal should be calm, affectionate, if necessary - strict. The animal should be called and reassured, stroking the females - between the ears and on the back, and cows - in any parts of the body. You should not approach the animal stealthily, as this scares it and causes a defensive reaction.

It is necessary to monitor the cleanliness of hands and tools, wash hands both before and after the examination of each animal, and if an infectious disease is suspected, hands are necessarily treated with a disinfectant liquid.

In practical activities, one is guided by the rules of approach and methods of fixing animals. Consistency and systematicity in the examination of animals reduces the possibility of accidentally missing important symptoms, creates an idea of the organism as a whole and makes it possible to objectively assess the results of the studies. Beating animals, rude shouts and sharp movements are unacceptable.

It should be remembered that with rude behavior during the procedures, they, regardless of their temperament, become dangerous - they develop a self-defense reflex.

Recommended Literature

1. Berezovsky A.V. et al. Physiology and pathology of reproduction of small animals. Textbook. Zhytomyr, "Polissya", 2017. 392 p.
2. Berezovsky A.V., Kharenko M.I. Physiology and pathology of the mammary gland in animals: Textbook. Kyiv: DIA, 2018. 476 p.
3. Koshovyi V.P. et al. Problems of reproduction of sheep and goats and ways to solve them. Kharkiv.-Dnipro: Gamaliya, 2014. 467 p.
4. Kharuta G.G. et al. Obstetrics, gynecology and artificial insemination of farm animals: textbook. Kyiv: Agrarian education, 2013. 445 p.
5. Yablonsky V.A. et al. Veterinary obstetrics, gynecology and biotechnology of animal reproduction with the basics of andrology. Vinnytsia: Nova Knyga, 2011. 608 p.
6. Vlasenko S.A. et al. Pharmacological support for intensive reproduction of cows. Bila Tserkva, 2019. 153 p.
7. Lyubetsky V.Yu., et al. Journal of obstetric and gynecological dispensary of cows: method. Recommendations. Kyiv: Publishing center of NUBiP of Ukraine, 2014. 160 p.

Information resources

1. "Scientific Bulletin of Veterinary Medicine" -[Electronic resource]. – Access mode: <http://nvvm.btsau.edu.ua/uk/arhiv-vs>
2. Ukrainian Journal of Veterinary and Agricultural Sciences [Electronic resource]. – Access mode: <https://ujvas.com.ua/index.php/journal/issue/archive>

3. Scientific Messenger of LNU of Veterinary Medicine and Biotechnologies. Series: Veterinary Sciences [Electronic resource]. – Access mode: <https://nvlvet.com.ua/index.php/journal/issue/archive>
4. Journal "Theoretical and Applied Veterinary Medicine" [Electronic resource]. – Access mode: <https://bulletin-biosafety.com/index.php/journal/issue/archive>
5. Collection of scientific papers "Veterinary science, animal husbandry technology and environmental management" [Electronic resource]. – Access mode: <https://hdzva.edu.ua/naukovi-vydannya>
6. Veterinary manual "Merck" [Electronic resource]. – Access mode: <https://www.merckvetmanual.com>
7. Scientific and practical journal "Veterinary medicine of Ukraine" [Electronic resource]. – Access mode: - <https://lib.dsau.dp.ua/book/2665>
8. Scientific and practical journal "World of veterinary medicine" -[Electronic resource]. – Access mode: <http://www.mirvet.com.ua/>
9. Scientific and practical journal "Veterinary practice" [Electronic resource]. – Access mode: http://www.invetbio.spb.ru/journal/vp_inform.htm

Laboratory lesson No. 1.

Functional disorders of female genital organs

Purpose of the lesson: To develop skills in practical research and diagnosis of gynecological diseases of *Functional disorders* in female farm animals.

Tasks:

1. To get acquainted with the causes of gynecological diseases.
2. To master the basic principles of providing medical care to females for gynecological diseases.
3. To get acquainted with the diagnostics of gynecological diseases of a dysfunctional nature.
4. To get acquainted with the methodology of conducting clinical and gynecological examination of animals.

Material and technical support for the lesson: male and female farm animals; a set of instruments by V. V. Pavlovsky, a device for obtaining scrapings by A. N. Zhaboyedov (PSG-1), a scarifier and a spoon-catheter by G. K. Korchak, a device for obtaining washes from the vagina of cows by G. V. Kazeev (PSK-1), vaginal mirrors for cows and sheep, pipettes and ampoules for introducing sperm to cows, an alcohol swab, bandages, cotton wool, isotonic NaCl solution, museum preparations of animal genital organs, stands and tables on the topic, gowns, aprons, arm warmers, gynecological gloves, 70° alcohol, rubber boots, vaginal mirrors with illuminators, an Esmarch mug, a Janet syringe, forceps, phonendoscopes, thermometers, percussion hammers, plesimeters, sterile vaseline, data on the state of animal reproduction, an insemination journal. reagents for laboratory diagnostics of uterine dysfunction and subclinical endometritis.

Lesson plan

1. Conduct a clinical and gynecological examination of a cow.
2. Study pathological morphological changes in the genitals during inflammatory processes on museum preparations.
3. Conduct diagnostics of gynecological diseases of a dysfunctional nature and provide medical care.
4. Conduct diagnostics and treatment of uterine and ovarian dysfunction, chronic vulvitis, vestibulovaginitis and vulvovaginitis.
5. Conduct a clinical and laboratory examination of an animal suffering from chronic uterine subinvolution, master the technique of intrauterine therapy.

Task 1. Conduct a gynecological examination of the reproductive system of female farm animals.

Explanation for the lesson.

A gynecological examination is an examination of the genitals of infertile females.

Gynecological diseases are a direct cause of infertility because unfavorable living conditions lead to the occurrence of one or another pathology of the reproductive organs or create a favorable background for the action of pathogenic factors.

Gynecological diseases include diseases of the ovaries, fallopian tubes, uterus, vagina, and vulva.

Diagnosis of diseases of the genital organs is carried out through a thorough clinical and gynecological examination of animals, taking into account the anamnesis. If necessary, special laboratory tests are performed.

When collecting Anamnestic data clarify the age of the animal, feeding and housing conditions during the dry period and after childbirth, the date of childbirth (or abortion), the nature of its course, whether or not the animal received obstetric care, whether or not there was a retained placenta, where and under what conditions the birth took place, the sanitary condition of the maternity ward, when and what the first signs of the disease appeared, whether the animal was treated and what treatment was prescribed, the nature of the manifestation of sexual cyclicity, the number and date of the last insemination.

After taking the history, a general clinical and special gynecological examination is performed. At the same time, the fatness and general condition of the animal, the condition of the hair and skin are taken into account, body temperature, pulse and respiratory rate, and the number of contractions of the scar are measured. If there are indications, the condition of the cardiovascular system, respiratory and digestive organs is examined in more detail. Then they proceed to the gynecological examination, which consists of an examination of the external genitalia and internal vaginal and rectal examinations.

During *external examination*, the general configuration of the croup, the condition of the ligaments, vulva, root of the tail and perineum are determined,

attention is paid to the presence and nature of discharge from the vulva, exudate or crusts on the root of the tail and in the area of the ischial tubercles.

Internal examination is performed in disposable polyethylene or rubber gynecological gloves. First, the vulva is opened with the fingers of the left or right hand and the mucous membrane of the vestibule of the vagina is examined. At the same time, its color is determined, attention is paid to the presence of mucus or exudate, hemorrhages, erosions, nodular or vesicular rash. After that, a vaginal examination is performed using a sterile vaginal speculum (treated with a non-smoking flame of an alcohol lamp), moistened with sterile saline or petroleum jelly. The external genitalia are washed with warm water, wiped with a cotton swab moistened with a solution of furatsilin 1:5000 or potassium permanganate 1:2000. When inserting the speculum, attention is paid to the animal's reaction and behavior, then the condition of the vaginal mucosa, the external opening of the cervix, and the cervical canal are carefully examined and determined, and the presence and nature of discharge from it are recorded.

In a healthy cow, the mucous membrane of the vestibule and vagina is pink or light pink, shiny, moist, covered with transparent, liquid and shiny mucus. The vaginal part of the cervix has the shape of a nipple or rosette, the cervical canal is usually closed (except for the stage of sexual arousal, when transparent mucus is abundantly released from the cervical canal). With the development of the inflammatory process, the vaginal part of the cervix is enlarged, swollen, red, its folds are thickened, the cervical canal is half-open and exudate is released from it. The cervical canal is considered to be half-open if an insemination pipette freely enters it.

After the vaginal examination, a rectal examination is performed, determining the location, size, consistency, tone of the cervix, body and horns of the uterus, as well as the condition of the fallopian tubes and ovaries.

Normally, the genitals of cows are located in the pelvic cavity or sometimes the uterine horns hang down from the pubic symphysis into the abdominal cavity, mobile, painless. The cervix is palpated in the form of a dense cylindrical roll with a diameter of 3-4 cm, the uterine horns are symmetrical, of elastic-elastic consistency, contract well when stroking, acquire a hemispherical shape and are completely grasped by hand. The ovaries have an oval or round shape, elastic-elastic consistency ; their size depends on the age and physiological state of the animal. As a rule, they contain follicles in the form of vesicles of various sizes (1-1.5 cm) or corpora lutea of various sizes and consistencies. More often, the corpus luteum has a denser consistency than other ovarian tissues. Sometimes the ovaries have a smooth surface. The fallopian tubes are not palpated.

Task 2. Get acquainted with the method of laboratory diagnostics of hypotension and chronic subinvolution of the uterus (express method according to Dudenko V. S. and Katerynov's test).

Methodology. Express method of studying lochia and cervical -vaginal mucus for detecting animals suffering from uterine hypotension according to Dudenko V. S. is based on the detection of increased indican content in lochia and estrous mucus and consists in the following : a 5 ml sample of mucus is placed in a

test tube, 5 ml of a 20% solution of trichloroacetic acid is added, mixed, kept for 3-4 min and filtered through filter paper. 4 ml of filtrate is transferred to a centrifuge tube, 2 ml of a 5% solution of thymol is added, mixed, then 6 ml of a reagent is added, which consists of 0.5 g of iron hexachlorochloride dissolved in 100 ml of hydrochloric acid, the specific gravity of which is 1.19, and left for 1 hour. Add 1 ml of chloroform-ethyl alcohol mixture (1:15) to the test tube, mix and centrifuge for 5 min. at 1 - 2 thousand rpm. Reaction assessment: chloroform transparent (-) normal uterine contractility; light pink (+) minor violations of uterine contractile function; pink color (++) uterine hypotension; pink-violet color (+++) uterine hypotension or atony; purple color (+++++) uterine atony.

Katerynov's test is performed to assess the degree of uterine involution. 3-5 ml of distilled water is collected in a test tube and a small ball of cervical mucus is added. Boil for 1-2 minutes. Reaction assessment: transparent liquid - uterine involution is complete; dirty-turbid liquid with flakes - uterine subinvolution.

Task 3. Based on the data obtained from the gynecological examination of infertile females, substantiate the diagnoses of functional disorders of the uterus and ovaries.

Explanation for the lesson.

The diagnosis of uterine dysfunction is made based on the following signs: the uterine horns are straightened and partially lowered into the abdominal cavity, flabby, and respond to massage only after a few minutes with short, weak contractions or do not respond at all.

According to G.G. Haruta and co-authors, if during one minute of uterine massage during rectal examination the uterine horns do not contract, but remain straightened, then this is a manifestation of uterine atony. A slight contraction of the uterus without twisting of the horns during the same time can be the basis for establishing the diagnosis of "uterine hypotonia". Sexual cycles are arrhythmic and due to the fact that sperm transport is disrupted in this dysfunction, numerous unproductive inseminations are noted. This indicates a change in the intrauterine environment and a decrease in the functional ability of the endometrium in the direction of prostaglandin F-2- α synthesis. It happens that sexual cycles do not manifest themselves at all. The corpus luteum may be delayed in the ovary.

When conducting differential diagnosis, it is necessary to exclude latent endometritis and persistent corpus luteum. For this, a laboratory test can be used.

Chronic uterine subinvolution is recognized after taking anamnesis, conducting clinical and gynecological examinations, including rectal examination. The diagnosis can be confirmed by conducting a laboratory study.

Persistent corpus luteum is diagnosed by analyzing anamnestic and registration data in special journals. It is found out whether the animal was inseminated after childbirth and if so, when. The absence of data on the onset of sexual desire and insemination in the presence of a corpus luteum in the ovary, which is found by rectal palpation, is the basis for making a preliminary diagnosis. The persistent corpus luteum has an elastic or doughy consistency and is contoured on the surface of the ovary in the form of a fungus or hemisphere. Sometimes the ovary may have the shape of an irregular oval, and with a central location -

spherical, with a conical protrusion at one of the poles. In parallel, attention is paid to the weak contractile activity of the uterus, which may be atonic, flaccid and hang down into the abdominal cavity. In young cows, symptoms of uterine hypotonia-atony are recorded less often. It is necessary to record in which ovary the corpus luteum is located and to confirm the diagnosis, another rectal examination of the ovaries should be performed in 3-4 weeks. If during the repeated examination the corpus luteum is found in the same ovary and in the same place, then this is a persistent corpus luteum.

M.I. Polyantsev recommends palpating the ovaries at intervals of 3-4 days for 2 weeks to *differentiate the corpus luteum*. If during this time the stage of sexual cycle excitation is absent and the corpus luteum has not regressed, then persistence occurs.

It is necessary to emphasize that an error in diagnosis during subsequent treatment can lead to abortion.

In mares, according to D.V. Podvalyuk, with a delay in the corpus luteum in the ovary, the uterus is slightly rigid, located at the bottom of the pelvic cavity. The ovaries are bean-shaped, of a dense consistency, with a tuberculate surface but without contouring corpus luteum and follicles. To simplify the assessment of the size of the ovaries of mares, the author suggests using an integral indicator (III), which is determined by adding the length, width and thickness of the ovaries. These three measurements are related to each other. In mares in a state of anaphrodisia, it is from 8 to 18 cm (from 8 to 10.5 cm is characteristic of ovarian hypofunction, and from 14 to 18 cm for persistent corpus luteum). For this pathology in mares, in addition to the described increase in ovarian size and anaphrodisia, a significant increase in the concentration of progesterone and the progesterone-estradiol ratio are characteristic.

When examining the labia, attention is drawn to their swelling, and sometimes even inversion.

During vaginal examination, a semi-open cervical canal can be seen, which contains an abnormally abundant secretion, swelling, and enlargement of the external opening of the cervix.

Rectal examination reveals an atonic uterus that descends into the abdominal cavity. Most often, a follicular cyst is diagnosed in the right ovary, which is palpated as a tightly fluctuating, painless, spherical mass the size of a table tennis ball to a tennis ball (from 2.5 to 15 cm in diameter).

In a mare, a follicular cyst is characterized by an increase in the ovary by 1.5–2 times compared to the gonads during the stage of sexual arousal, when they have an average size of 6.8x3.9x3.8 cm. Fluctuating formations up to 5 cm in diameter are palpated in the ovary. Depending on the location and size of the cyst, the ovaries change configuration, taking on a bean-shaped, pear-shaped or tuberculate shape. They fluctuate. ***Nymphomania is recorded.*** More often, one ovary is affected, although bilateral follicular cysts are also found. But even with the formation of a cyst in one ovary, the function of a healthy ovary is also impaired: the growing follicles can be palpated, but they do not mature and do not

ovulate. Fertilization does not occur because an unfavorable environment for sperm is created in the uterus and fallopian tubes.

Luteal cyst is less common in cows. It develops from a persistent corpus luteum, an unovulated follicle that has undergone luteinization, or from a follicular cyst as a result of degeneration and liquefaction of centrally located corpus luteum cells with the formation of a small cavity in which a homogeneous secretion with a small progesterone content accumulates. Clinically, it is manifested by anaphrodisia.

A luteal cyst is recognized based on anamnestic data, analysis of records in the "Journal of Insemination and Calf Registration of Cattle", clinical signs, and rectal examination of the animal.

When palpating a corpus luteum cyst, it is noted that it is the size of a plum and has thicker, denser walls that prevent the detection of pronounced fluctuations of this cyst. The ovary, in which a large luteal cyst develops, acquires a spherical shape. The uterus is atonic, flaccid. Often, only a preliminary diagnosis of a luteal cyst can be made. The main reasons for this are a significant increase in the ovary and anaphrodisia.

In mares with a luteal cyst, the uterus is slightly rigid, and the ovaries are enlarged 2-4 times. The cyst is defined as a rounded, thick -walled, tightly fluctuating formation up to 7 cm in diameter. The cervix is reduced, closed, and there is a thick mucous plug in the cervical canal. Anaphrodisia is recorded.

Transrectal (in cows, mares, pigs, sheep) and transcutaneous (in dogs, cats) ultrasound sonography makes it possible to diagnose follicular and luteal cysts. It is especially important in the diagnosis of small cysts that cannot be detected by palpation.

On ultrasonography, follicular cysts appear as dark, echonegative cavities surrounded by a thin, erogenous wall.

Luteal cysts have a layer of dense luteal tissue and dark fluid-filled cavities in the center. The ovarian tissue has a more hyperechoic appearance compared to cysts.

Single cysts are visualized on an echogram as one or two large cavities, while multiple cysts show a significant number of small ones, varying in size and cavity shape.

Polycystic ovaries are a disorder of the structure and function of the ovaries, which is based on disorders of the folliculogenesis process, which are accompanied by an increase in the release of LH simultaneously with a decrease in the concentration of FSH, resulting in a distortion of the synthesis of estrogens from androgens and activation of androgen synthesis. In such conditions, instead of the formation of a dominant follicle in the ovaries, the process of cystic atresia of the cavitary follicles begins.

The causes of this ovarian dysfunction are the unreasonable and frequent use of estrogens, gonadotropins, and prostaglandins to stimulate sexual function, induce superovulation, synchronize sexual cycles, treat animals with obstetric and gynecological diseases, and overuse of these drugs.

Clinically, the disease manifests itself in arrhythmic sexual cycles and masculinization.

Rectal examination reveals an ovary, the entire surface of which is heterogeneous, sometimes rough, resembling cartilage to the touch, covered with many small vesicles ranging in size from poppy seeds to hemp seeds of a fairly dense consistency (microcystic ovary), or covered with several larger (pea to hazelnut size) rounded tubercles. The ovary may be painful. The uterus may be enlarged, have a denser consistency and thicker walls.

Diagnosis of delayed ovulation or an anovulatory sexual cycle is carried out by rectal palpation of the ovaries. Given that ovulation in cows occurs 10-15 hours after the end of the sexual heat, the first study is carried out 5-7 hours after its end, and then every 2 hours. After ovulation, the ovary decreases, softens; in place of the follicle that bursts, we find a depression. If 24-48 hours after the end of the heat we find an unovulated follicle, we can talk about delayed ovulation.

The diagnosis of "Silent Hunting" is made based on the results of one or two rectal examinations. A vaginal examination (color and moisture of the vaginal mucosa and vestibule) clarifies the diagnosis. A good auxiliary test is a two-time control of the level of progesterone in milk with an interval of 10 days. Determination of the content of progesterone in milk is carried out using a kit for the rapid ELISA test of the company Vetoquinol (France) or others. *For example*, if the progesterone level was low in the first examination, and high in the second, 10 days later, then starting from the 8th day after the second examination, the cow should be carefully observed, because it is during this period that estrus is possible. If the first examination found a high progesterone content, and the second one found a low one, then the animal should be monitored, as this condition is characteristic immediately before estrus. If both the first and second milk samples have low progesterone levels, this is an indicator of low ovarian function, accompanied by anaphrodisia.

Questions for self-control

1. Name the main gynecological diseases?
2. Causes of congenital and acquired anomalies of the development of the genital organs?
3. What does a gynecological examination consist of. What is its sequence?
4. For the diagnosis of which processes in the genitals are clinical examination methods suitable?
5. What are the reactions of the animal to massage of a normal and pathologically altered uterus?

Laboratory lesson No 2.

Inflammatory processes in the female genital organs

Purpose of the lesson: To develop skills in practical research and diagnosis of gynecological diseases of *Inflammatory processes* in female farm animals.

Tasks:

1. To get acquainted with the causes of inflammatory gynecological diseases.
2. To master the basic principles of providing medical care to females for inflammatory gynecological diseases
3. To get acquainted with the diagnostic and therapeutic algorithm for controlling inflammatory gynecological diseases.
4. To get acquainted with the methodology for conducting therapeutic and preventive measures for infectious and invasive diseases that cause infertility.

Lesson plan

1. Conduct a clinical and gynecological examination of a cow.
2. Study pathological morphological changes in the genitals during inflammatory processes on museum preparations.
3. Conduct diagnostics of gynecological diseases of an inflammatory nature in the external and internal genital organs and provide medical care
4. Conduct diagnostics and treatment of chronic inflammatory processes of the uterus and ovaries: chronic vulvitis, vestibulovaginitis and vulvovaginitis.
5. Conduct clinical and laboratory examination of an animal suffering from chronic and subclinical endometritis, master the technique of intrauterine therapy.

Material and technical support for the lesson: male and female farm animals; a set of instruments by V. V. Pavlovsky, a device for obtaining scrapings by A. N. Zhaboyedov (PSG-1), a scarifier and a spoon-catheter by G. K. Korchak, a device for obtaining washes from the vagina of cows by G. V. Kazeev (PSK-1), vaginal mirrors for cows and sheep, pipettes and ampoules for introducing sperm to cows, an alcohol swab, bandages, cotton wool, isotonic NaCl solution, museum preparations of animal genital organs, stands and tables on the topic, gowns, aprons, arm warmers, gynecological gloves, 70° alcohol, rubber boots, vaginal mirrors with illuminators, an Esmarch mug, a Janet syringe, forceps, phonendoscopes, thermometers, percussion hammers, plesimeters, sterile vaseline, data on the state of animal reproduction, an insemination journal. reagents for laboratory diagnostics of uterine dysfunction and subclinical endometritis.

Task 1. Conduct a gynecological examination of the reproductive system of female farm animals.

Task 2. Based on the data obtained from the gynecological examination of infertile females, substantiate the diagnoses of inflammatory processes of non-infectious origin in the external and internal genital organs.

Explanation to the lesson. When diagnosing inflammatory processes in the female genitalia, it is necessary to know that inflammation of the vestibule of the vagina (vestibulitis) and the vagina (vaginitis or colpitis) occurs when microflora enters and the mucous membrane is damaged during insemination, as a

complication of injuries and wounds, as well as with inflammation of the uterus. The inflammatory process can develop after a chemical burn of the mucous membranes with the incorrect appointment of certain medicinal substances for washing the vagina.

It can be serous, catarrhal, purulent, fibrinous and other forms of inflammation. The general condition of the animal is satisfactory. You can observe frequent urge to urinate and defecate, after which the animal stands for a long time, hunching its back, looks back, and sometimes, leaning on some hard object, makes movements with its croup.

Diagnostic testing for vestibulovaginitis is best performed after performing low sacral anesthesia.

In serous and catarrhal inflammation, hyperemia and edema of the mucous membrane of the vestibule of the vagina and vagina are observed, hemorrhages of various shapes are observed on the side and lower walls. Then exudate appears in the lower part of the labia and on the tail. In purulent and fibrinous inflammation, the process is complicated and the general condition of the animal worsens. A lot of purulent exudate is released from the genital slit, the body temperature rises, the animal is in a depressed state, and after defecation and urination it groans. Sometimes the inflammation is complicated ***Bartholinitis and cyst of the Bartholin glands***, protruding into the vaginal lumen, as well as ***Gardneritis***.

Gartnerite – this is an inflammation of the vaginal wall in the area of the Gartner ducts in cows and mares. The disease is often observed with trichomoniasis. Initially, it manifests itself as swelling and striped hyperemia of the lower and lateral walls of the vagina, and then the formation of cord-like thickenings that can reach the cervix. The animal is restless.

Chronic endometritis (endometritis) chronica). Depending on the nature of the exudate, catarrhal and catarrhal -purulent endometritis are distinguished, which in a certain way determines the degree of damage to the morphological structures of the mucous membrane of the uterine wall.

The general condition of the sick animal practically does not change, the sexual cycle manifests itself rhythmically and fully, but exudate is constantly or periodically released from the genital slit in small portions. Its greatest release occurs during estrus.

Laboratory examination of the exudate does not reveal mucin, but it contains sulfur-containing amino acids and has increased proteolytic properties (G. M. Kalinovsky).

Rectal examination can reveal thickening and rigidity of the wall, enlarged uterine horns, and the presence of exudate in their cavity.

Chronic endometritis can be complicated by processes such as pyometra (accumulation of purulent exudate in the uterine cavity), *hydrometra* or *myxometra* (accumulation of watery transudate or mucus), and *subclinical chronic endometritis*.

Subclinical endometritis is one of the forms of chronic catarrhal endometritis, which does not have clearly expressed clinical signs. In cows, it occurs as a result of repeated episodes of postpartum endometritis, hypotension,

atony and subinvolution of the uterus, after retained placenta and other complications of childbirth, as well as with their untimely and ineffective treatment. The development of latent endometritis is facilitated by inadequate feeding of animals in the winter-spring period. According to G.I. Pidoprigora, 61% of cows that came to heat 1-9 times after childbirth were not fertilized during artificial insemination, because they had subclinical endometritis.

In **subclinical endometritis** during the estrus period, the mucus does not change in physical parameters: it is transparent, odorless, and only upon close examination can various impurities be noticed, more often in the form of a cloudy opalescent haze and less often in the form of light gray flakes, streaks of catarrhal exudate or pus. The disease is accompanied by numerous unproductive inseminations. Sexual cycles occur regularly after 3 weeks, in some animals arrhythmically.

In mares during the period of sexual hunting with subclinical endometritis, the accumulation of a large amount of cloudy mucus of increased viscosity in the vagina is noted. This mucus has a slightly acidic reaction (pH 6.5 - 6.9), in which sperm lose mobility. The cervix is very large, located non-centrally. When washing the uterus with saline solution (200 - 300 ml), cloudy fluid flows back. The sexual cycle is arrhythmic - sometimes short, sometimes prolonged. In most cases, fertilization of mares does not occur or an early, unnoticed abortion occurs (after 1 - 2 months of foaling).

The main cause in the pathogenesis of infertility caused by subclinical chronic endometritis is the sulfur-containing amino acid cysteine, which has a toxic effect on the contractile apparatus of sperm. Along with this, ammonia, hydrogen sulfide, and hydrogen peroxide, which are formed as a result of cysteine conversions in the uterus, have a detrimental effect on sperm.

During rectal examination of cows with latent endometritis, the uterus contracts well, the ovaries are of dense consistency, have a tuberculate surface, on which it is possible to distinguish follicles that are maturing and corpora lutea that are invading. That is why the diagnosis of latent endometritis by rectal examination and by the physical properties of estrous mucus is difficult.

To clarify the diagnosis, a uterine biopsy or laboratory examination of estrous mucus is performed.

Biopsy is used to obtain material that is subjected to histological examination. In sick animals, desquamation of the integumentary epithelium, destruction of the uterine glands, hyalinosis of the vascular walls, focal lymphocytic reaction, and the presence of fibroblasts in the compact layer of the endometrium are detected.

Ultrasonographic studies indicate that the echogenicity of the uterus and its inclusions varies depending on the form of inflammation.

In the acute form of endometritis, the uterine horns do not increase in size, compared to the uterus of an animal that is in a state of excitement.

During the examination, small drops of fluid with a diameter of 0.3–0.4 cm are detected, located at the bottom of the uterus. The number of drops of uterine

secretion is greater than in animals during the stage of excitation. The drops of fluid have low echogenicity and are visualized as dark rounded formations.

In chronic endometritis, the uterine horns thicken and lengthen. As a result, the echogenicity of the uterine walls increases (the image of the walls on the monitor becomes gray, and in some areas white, which is due to the degeneration of the uterine layers), and the diameter of the cavity of the horns increases several times.

Depending on the degree of exudation, the uterine cavity shows the accumulation of a large number of round or elongated drops of fluid with a diameter of 0.3–0.8 cm. If the evacuation of the secretion is impaired, bubbles with a diameter of 1–2 cm are visualized on the lower wall of the uterus.

The echogenicity of the secretion in chronic endometritis changes. Thus, small vesicles have a dark color, and large ones have a dark gray color. Sometimes the fluid of the vesicles contains “flakes” – white inclusions, which increases their echogenicity. In this regard, the uterine secretion changes from dark gray to gray-white, and in some cases to almost white.

Pyometra – a complication of endometritis, which is characterized by an increase in the size of the uterus due to the accumulation of fluid in it.

If in acute and chronic endometritis the fluid is located in the uterus in the form of drops, then in pyometra it fills the entire horn. In this case, the uterus resembles a full bladder.

The echogenicity of the fluid depends on the concentration of “flaky” inclusions in it. At high concentrations, the uterine fluid has a gray-white color, and at low concentrations, it is gray.

As a rule, the walls of the uterus in this pathology are thickened, which distinguishes it from a pregnant uterus.

For an accurate diagnosis of pyometra, it is necessary to examine all the horns of the uterus and differentiate it from a pregnant uterus, in which there is an embryonic bladder, embryo, or fetus.

Pyometra develops under conditions when catarrhal endometritis is accompanied by involution of the uterine horn, swelling of the cervix, its overgrowth or adhesions of the vagina. Finding no way out, the catarrhal exudate accumulates in the uterine cavity, turning it into a kind of bag filled with pus, the amount of which reaches 3-15 liters in large animals. During rectal examination, the uterus feels tight, swollen, fluctuates.

The disease is most common in dogs and cats, especially those that have never been pregnant and in which sexual cyclicity disorders have been observed (weak expression or disturbance of the rhythm of estrus). Exacerbation of pyometra occurs after the next estrus: usually on the 3rd-8th day polydipsia and polyuria develop, the abdomen increases in volume, an enlarged uterus is palpated. The labia are swollen, the animal constantly pays attention to them, licking droplets of exudate.

Abundant purulent discharge indicates open pyometra. In the closed form of the disease, there is no discharge from the genitals and swelling of the vulva.

The disease progresses rapidly, causing changes in the general condition of the animal.

The accumulation of pus in the uterine cavity can be so great that the walls of the uterus cannot withstand the pressure, melt and rupture, leading to diffuse peritonitis.

Inflammation of the ovaries (oophoritis) develops in diseases of the fallopian tubes, uterus, bladder, rectum, after uterine eversion, surgical separation of the afterbirth, injuries during gross rectal examination, massage, enucleation of the corpus luteum, crushing of cysts, after non-sterile puncture of a follicular cyst.

When making a diagnosis, it should be taken into account that in acute oophoritis (serous, hemorrhagic, purulent), the affected ovary is enlarged 2-4 times (like a chicken egg), painful, swollen, doughy or elastic. The pulsation of the middle uterine artery and ovarian vessels is well felt. In chronic oophoritis, the ovary is palpated as a small, irregularly shaped tubercle. Often, connective tissue growth and the formation of adhesions with the fallopian tube and ligaments are observed, as a result of which the mobility of the ovary becomes limited and therefore it is difficult to grasp it with your hand. Sexual cycles are prolonged, arrhythmic; even more often, especially in bilateral oophoritis, anaphrodisia is recorded. The following associations are observed: acute serous oophoritis - endometritis, purulent oophoritis - endometritis; chronic oophoritis - chronic endometritis. Sometimes the inflammatory process from the ovary spreads to the serous membrane (**perioophoritis**), and then a connective tissue capsule forms around the ovary, compressing the vessels and tissues of the gonad and preventing palpation of the ovary.

Task 3. Get acquainted with the methods of laboratory diagnosis of subclinical endometritis.

Express diagnostic method according to V.S. Dubenko is based on the detection of toxic substances of the aromatic series in estrous mucus during inflammatory processes. To carry it out, 2 ml of lochia or estrous mucus, 2 ml of distilled water and 2 ml of a 20% solution of trichloroacetic acid are added to a test tube, mixed with a glass rod and filtered through a paper filter. 2 ml of the filtrate are transferred to another test tube, 0.5 ml of nitric acid are added, carefully boiled for 1 minute, after which 1.5 ml of a 1% solution of caustic soda are added.

If the solution is clear, the animal is healthy; if it is yellow-green, the animal has mild catarrhal endometritis; if it is amber, it has a severe form of purulent-catarrhal endometritis; if it is yellow, it has purulent-catarrhal endometritis.

Express method for diagnosing subclinical endometritis according to Kalinovskiy G.M. is based on the detection of sulfur-containing amino acids in estrous mucus. 4 ml of 0.5% lead acetate solution and 10 drops of 20% sodium hydroxide solution are added to the test tube, and then 0.5 - 1 ml of estrous mucus taken immediately before insemination of the cow is added. The test tube is shaken gently, gradually heated for 2 - 3 times without bringing to a boil. Darkening of the liquid in the test tube, its acquisition of a brown or black color indicates the presence of sulfur-containing amino acids in it, absorbed by the mucins of uterine mucus. During the reaction, these amino acids give off sulfur, which joins lead,

forming lead sulfide and thus the mixture darkens. In the absence of an inflammatory process in the uterus, the mixture is not colored.

Diagnostic test for subclinical endometritis in cows according to Gavrish V.G. is based on the detection of histamine in urine using a *lapis test*. To 2 ml of the urine under study, placed in a test tube, add 1 ml of a 5% aqueous solution of lapis (silver nitrate) and carefully boil for 2 x in gas or alcohol vodka. A precipitate appears at the bottom of the test tube (black - positive, brown and lighter - negative). The described express diagnostic method differs favorably from others in that its implementation is not associated with the onset of the stage of excitation of the sexual cycle in animals.

Cytological examination of a smear of mucus according to Pankov B.G. is advantageous in that it allows for early diagnosis of latent endometritis, without waiting for the onset of estrus and provides an opportunity to start treatment earlier, and thus reduce the number of days of infertility. To diagnose latent endometritis, mucus is taken from the surface of the mucous membrane of the ventral fornix of the vagina. A smear is made, stained according to Romanovsky - Giemza, examined under a microscope and the tissue index (ratio of somatic cells to white blood cells) and toxic factor (ratio of pus bodies to neutrophils) are determined. In endometritis, the tissue index is 0.5 - 1.7, and toxic - 0.25 - 0.55 and more. The author recommends checking for latent endometritis in cows: newborns - on the 15th day after giving birth; those who were sick with clinical endometritis - on the 3rd - 5th day after the course of treatment; inseminated - on the 20th - 23rd day after insemination; infertile - at the balancing stage of the sexual cycle. *Estrous* A drop of sperm is placed in the mucus and covered with a coverslip, examining the preparation under a microscope. In the case of the disease, massive agglutination of sperm is observed.

Sometimes, to clarify the diagnosis, bacteriological and mycological studies are performed, as well as antibiotic titration, for which cervical mucus samples are taken.

According to the method described by Serebryakov Yu.M. and co-authors, disposable sterile polystyrene pipettes and polyethylene ampoules intended for artificial insemination of cows are used. Over the flame of an alcohol lamp, sterile saline is collected in both ampoules and, having attached one ampoule to the pipette, the saline is sucked into the pipette. After that, a second ampoule is attached to the opposite end of the pipette. In this form, the device is prepared for work. A speculum is inserted into the cow's vagina, the ampoule is disconnected from the device and pushed into the cervix. The saline is injected, the contents of the cervical canal are sucked, and, having removed the device from the genitals, its tip is wiped with an alcohol swab and the ampoule is attached. The materials are delivered to the laboratory.

It is also possible to conduct a functional test for subclinical endometritis with prostaglandin F-2 alpha on the 28th - 65th day after calving. After a single dose of 500 µg of estrophan, discharge from the genitals of uterine secretions mixed with flakes of catarrhal exudate is recorded in 16% of cows and 12% of heifers. Repeated administration of prostaglandin after 11 - 12 days to both animals

that showed estrus after the first injection and animals that did not respond to the first injection induces estrus in 92 - 96% of treated cows and heifers. Double administration of prostaglandin F-2 alpha allows to detect subclinical endometritis in 20% of cows and 18% of heifers. In all cows and heifers with subclinical endometritis, after repeated administration of the drug, lightening of the mucus is noted, which indicates that the functional test with prostaglandin is also a therapeutic agent.

Task 4. Familiarize yourself with the methods for detecting the passage of the fallopian tubes.

Explanation to the lesson. In the absence of inflammation, the fallopian tubes are not found during rectal examination. In **salpingitis**, the fallopian tube is felt in the ovarian ligament as a bead-like formation.

Salpingitis often develops as a result of the transition of the inflammatory process from the uterus or ovaries to the fallopian tubes. *Chronic salpingitis* can be diagnosed by rectal examination, in which the fallopian tubes are palpated in the form of knotty dense cords about a finger thick. In *hydro- and pyosalpingitis*, a round or oval fluctuating bladder is palpated between the ovary and the apex of the uterine horn. Touching the fallopian tube in the presence of purulent exudate causes a painful reaction in the animal. If chronic salpingitis is accompanied by the growth of connective tissue (endomyoperisalpingitis), then the fallopian tubes are palpated in the form of dense, tuberculate cords. Adhesions of the fallopian tubes with the ovaries, uterus, and pelvic walls are also recorded.

But *rectal examination* can only detect significant changes in the fallopian tubes, in which case treatment will be ineffective. Early forms of pathological processes that develop in the fallopian tubes and are still amenable to treatment are diagnosed by pertubation, chromohydrotubation, or a combination of these.

Yu. A. Skrypitsyn proposed a method of pertubation of cows and heifers to detect the passage of the fallopian tubes. To perform this manipulation, the animal is fixed in a machine, the external genitalia are washed with warm water and soap and then with a solution of furatsilin. Through the vaginal speculum, the cervix is grabbed with forceps and pulled up to the vulva, after which the speculum is removed. A catheter is passed through the cervical canal, and a special obturator, which is located on the catheter, hermetically closes the cervical canal, after which the catheter is fixed to the forceps placed on the cervix and the uterus is lowered into the pelvic cavity. Using Richardson layers, air is blown in and the manometer needle is constantly monitored. If the fallopian tubes are passable, then after the pressure in the system reaches 60 - 80 mm Hg, it begins to slowly decrease. With narrowing or unilateral patency of the oviducts, the pressure reaches 100–120 mm Hg. In heifers with normal patency of the oviducts, the pressure drops to 80–100 mm Hg. and under conditions of narrowing and unilateral patency, to 110–130 mm Hg.

The condition of each oviduct (patency and peristalsis) can be determined using pertubation two-channel catheter Yu. K. Chernyus.

For chromohydrotubation according to V.I. Schnitzer, a 0.2% solution of methylene blue in a 1% solution of novocaine is used. The solution is prepared as

follows: 240 ml of a 1% solution of novocaine is added to 60 ml of a 1% solution of methylene blue, boiled in a water bath, cooled and used at a temperature of 40 - 42 ° C, having previously dissolved 3 million units of penicillin and streptomycin. The solution is introduced into the uterine cavity using a pertubation apparatus, to which a vessel from the Bobrov apparatus is attached.

The cow is fixed in the machine. The catheter is inserted into the cervix as in pertubation. Air is pumped into the apparatus first to the division of 60 mm Hg. st., and after a 1-2 minute break to 100 in cows. 200-300 ml of solution is injected into the uterus of cows, and 100-200 ml into the uterus of heifers. After 3, 6, 12 and 24 hours, urine samples are taken through the catheter in tubes of the same color and size.

If the fallopian tubes are patent, the urine will turn green 3–6 hours after the administration of the methylene blue solution. The green color disappears after 12–15 hours. In bilateral obstruction, the urine color does not change because the methylene blue solution cannot be absorbed by the fringe and peritoneum and therefore excreted in the urine.

Pertubation and chromohydrotubation are performed only in cows and heifers in which inflammatory processes of the vagina and uterus have been excluded by clinical examination. Before carrying out these procedures, animals should be administered 5-7 ml of a 0.1% solution of atropine sulfate to relieve spasmodic state of the oviducts.

The simplest pertubation is performed using a syringe-catheter for insemination of cows. The piston is removed from the catheter, a tube with an Evers apparatus is attached, and the catheter is inserted into the cervix to a depth of 10–16 cm using a vaginal speculum. 60–70 air pressures are made.

A.Yu. Tarasevich suggested to check the patency of the fallopian tubes in cows by epidural injection of 2 ml of pituitrin and performing a rectal examination. If there is no corpus luteum in the ovary and the tubes are passable, then the contraction of the fallopian tubes can be felt with the fingers. If the ovaries are impassable, there will be no reaction to pituitrin.

Task 5. Based on the data obtained from the gynecological examination of infertile females, substantiate the diagnoses of inflammatory processes of infectious origin in the external and internal genital organs.

Explanation to the lesson. Let us consider the diagnosis of only those diseases that are sexually transmitted and cause specific inflammatory processes of the mucous membranes of the vulva, vestibule of the vagina and vagina (vulvitis and vestibulovaginitis). They can be differentiated by clinical signs.

Trichomoniasis is an invasive disease of cattle. Animals are infected during sexual intercourse, as well as through the semen of bulls with trichomoniasis. A few days after coitus, swelling of the vulva and mucous membrane of not only the vestibule of the vagina, but also the vagina is noted. On the mucous membrane of the vestibule, nodules can be found, which are scattered diffusely around the clitoris. In the subacute and chronic phases of the disease, nodules ranging in size from a millet grain to a small pea are found along the entire length of the vagina.

These nodules become hard and rough. When inserting a hand into the vagina, a feeling of a “grater” is created.

Fertilization is not impaired, but abortion is observed in the 2nd - 7th, and more often in the 4th month of pregnancy. In some cows, the fetus dies in the 3rd - 4th month of pregnancy, pyometra develops.

To detect the causative agent of trichomoniasis, a “crushed drop” preparation is prepared from mucus or exudate.

In case of endometritis or pyometra, for examination for trichomoniasis, vaginal exudate is taken with the branches of a vaginal speculum or a spoon-catheter of G.K. Korchak and transferred to a sterile test tube or bottle. During estrus, mucus is collected by the same method or sucked with a syringe into a polystyrene pipette, the ends of which are sealed.

In the absence of estrous mucus or exudate, vaginal washes are performed using a G.K. Korchak spoon-catheter. To do this, the spoon is inserted into the vagina and through the hole in its handle, the mucous membrane is irrigated with saline solution for 30-40 seconds, after which the wash fluid is collected in a sterile container.

However, in vaginal swabs it is not always possible to detect trichomonads, so it is better to make scrapings of the mucous membrane with a scarifier G.K. Korchak. To do this, the labia are opened with the fingers of the left hand, and the device is inserted into the vagina to the cervix with the right hand. Perform 20-25 light reciprocating movements of the scarifier head to the middle of the vagina, after which the instrument is removed and the collected mucus is washed off from the head with 2-3 ml of sterile saline.

Considering that trichomonads parasitize in the uterine cavity and may be absent from the vaginal contents when the cervical canal is closed, it is recommended to administer 2–3 ml of a 1% solution of sinestrol subcutaneously to the cow 24 hours before sampling.

In the case when the mucus is thick, it can be diluted with sterile saline and mixed thoroughly. The drop is examined in a darkened field of view under low (120) and then under high magnification of the microscope (280), preferably immediately after obtaining the material. Trichomonas are motile and have a noticeable vibrating membrane. It is also possible to carry out microscopy of dead trichomonads in a prepared stained smear.

For cultural research, the obtained material is sent in test tubes or a thermos with ice no later than 6 hours after its receipt.

Campylobacteriosis is an infectious disease of cattle and sheep, as well as pigs. The disease is highly contagious. The pathogen is transmitted during sexual intercourse, through care items and bedding; sheep are infected through feed and water.

The most characteristic signs of campylobacteriosis are multiple unproductive inseminations, the manifestation of irregular sexual cycles, which last from 25 to 35 days. In the acute phase of inflammation, the vulva is swollen, the mucous membrane of the vestibule is bright red, covered with catarrhal exudate. You can observe abundant mucus discharge, sometimes with blood impurities. On

the upper lateral walls of the vestibule and diffusely around the clitoris - a rash in the form of nodules the size of a poppy to a millet grain. In 10-15 % of cows after infection, abortion occurs at 2-3 months of pregnancy. Characteristic features of the fetal patkarkina are the presence of red spots in the head and neck area and accumulation of turbid fluid in the chest and abdominal cavities, in particular in the stomach.

Abortions in heifers with campylobacteriosis are not recorded. Pregnancy and childbirth in them do not have noticeable deviations, but calves are born limp, non-viable, do not drink colostrum and die in the first days of life.

In sheep Campylobacteriosis is characterized mainly by abortions 4–6 weeks before calving (up to 70% of the population).

Laboratory diagnostics of campylobacteriosis. The causative agent of campylobacteriosis can be detected as follows: a smear made from mucus is stained with gentian violet, methylene blue or another bacteriological dye. The stained smears are examined under a microscope through an immersion lens. The causative agent of campylobacteriosis has the appearance of a comma or corkscrew.

Infectious follicular vestibulovaginitis is quite often recorded in cows and heifers. Until now, the question of the causative agent of the disease remains debatable (Ostertag's streptococcus, a virus or the activation of opportunistic microflora in conditions of reduced animal resistance under unsatisfactory feeding and housing conditions), but it is known that the main way of its spread is sexual.

The diagnosis is made after taking a history (repeated unproductive inseminations, mating with a bull, after 2-7, and sometimes after 10-14 days, after which the animal more often takes a position for urination, wags its tail, scratches its back, beats its limbs on the abdomen) and examining the vestibule of the vagina. Hyperemia and edema of the mucous membrane of the vestibule of the vagina with the presence of light red smooth nodules on it, similar in size to millet grains, which are collected near the clitoris in bunches, and on the sides in the form of chains, indicate that the cow has acute follicular vestibulovaginitis. These nodules are well palpated and bleed when touched. Nodules are observed on the upper wall of the vestibule of the vagina. The chronic form of vestibulovaginitis is characterized by the disappearance of edema of the mucosa, its yellowing, reduction of nodules to the size of a poppy seed, their better delimitation and change of color to yellowish-white or pale. Signs of catarrhal -purulent vestibulitis (exudate discharge) are observed, and in some animals fibrinous inflammation develops around the clitoris.

Bullous rash (pustular vestibulovaginitis, coital eczema or infectious rhinotracheitis) is a contagious viral disease characterized by a chronic persistent course of infection with periodic exacerbations and manifested by rhinitis, tracheitis, conjunctivitis, vestibulovaginitis, balanoposthitis, abortions and necropermia.

Pustular vestibulovaginitis affects cows and mares. The virus remains latent in the animal's body for a long time and is reactivated under the influence of stress

factors. Infection occurs during mating and artificial insemination with sperm obtained from sick breeding animals. The virus can be transmitted through litter.

The diagnosis is made based on clinical signs, taking into account the epizootic status of the farm.

The general condition of the animals is depressed, they refuse food, reduce milk production. There is severe itching in the area of the external genitalia. Sick animals wag their tails, rub their vulva against poles and walls of the machines, and often take a position of urination.

3-6 days after infection, the mucous membrane of the vestibule of the vagina is swollen, covered with dark red spots and speckled hemorrhages, especially in the area of the clitoris and the inner surface of the labia. At the same time, mucous overlays can be seen. Over time, transparent vesicles are formed, the size of a millet grain to a pea, the cavity of which contains first serous and then purulent exudate. After their rupture, erosions and ulcers appear in place of the pustules. The contents of the pustules collect in the form of a yellowish creamy purulent exudate at the bottom of the vestibule of the vagina, flow out and dry up in the form of crusts in the area of the lower corner of the labia and at the root of the tail. After 4 days, the ulcers heal on their own. Smooth white scars remain in place of the ulcers.

Task 6. Learn methods for obtaining scrapings and washes from the genitals of female farm animals.

cervical mucus samples are taken using the methods below.

Methodology of N. N. Mikhailov and co-authors. A polystyrene insemination pipette is connected to a syringe (5 ml) using a cannula from an intravenous needle and a rubber tube 2–3 cm long. 2–3 ml of sterile isotonic sodium chloride solution is drawn into the syringe. The vagina is opened with a mirror equipped with an illuminator; the pipette is inserted into the cervical canal to a depth of 2–3 cm, the solution is injected and sucked back together with cervical mucus. In order to avoid contact of the pipette with the vaginal mucosa, it is advisable to use polyethylene sanitary covers. Over the flame of an alcohol lamp, the sample is poured from the syringe into a test tube containing 1 ml of isotonic sodium chloride solution.

The test tubes with the samples are placed in a thermos with ice and sent to the laboratory.

After use, pipettes are washed in a soda solution, and then disinfected in 75° alcohol for 24 hours. After disinfection, they are washed several times with distilled water and isotonic sodium chloride solution.

Considering that according to the method of N. N. Mikhailov and co-authors, the selected mucus samples have to be transferred from the pipette to a test tube (directly near the cow), which is not very convenient, Yu. M. Serebryakov and co-authors suggest using polystyrene pipettes and disposable polyethylene ampoules for obtaining the contents of the uterine secretion, which are intended for artificial insemination and are supplied sterile in polyethylene bags. According to this method, the device is first prepared for work: sterile saline is collected in both ampoules over the flame of an alcohol lamp and, having attached one ampoule to

the pipette, saline is pumped into it, after which the second ampoule is attached. A speculum is inserted into the cow's vagina, the ampoule is disconnected from the device and inserted into the cervix. The saline is injected and the contents of the cervical canal are sucked. After that, the device is removed from the genitals, the end is wiped with cotton wool moistened with alcohol, and the ampoule is attached. The material is delivered to the laboratory.

Samples of cervical secretion for bacteriological examination can also be obtained using special *instruments designed by V.V. Pavlovsky or A.N. Zhaboyedov*.

The set of instruments designed by V.V. Pavlovsky is intended for taking mucus samples from the vault of the preputial cavity in bulls and rams and from the cervix and vagina in cows and ewes for bacteriological and serological studies.

Tool 1 consists of inner and outer safety tubes, a rod that is screwed together from two halves and has a removable tip on one end and a handle on the other.

Tool 2 consists of a glass tube and a pusher with a rubber tube.

Tool 3 consists of a glass tube and a metal ejector.

Tool 1 is sterilized by boiling before use, for which the rod is unscrewed, a rubber burner is put on the outer safety tube and fixed with a thin rubber ring. The tip with tampons is sterilized in autoclaves in separate Florinsky tubes, closed with cotton or rubber stoppers. When assembling the tool, the rod is screwed, inserted into the inner safety tube and connected to the tip over the flame of an alcohol lamp, which is pulled inward, after which the outer tube is put on.

Method of taking mucus samples from females. To take a sample of mucus from the cervix, the cow is fixed, the external genitalia are thoroughly washed. After preparation for work, the assistant inserts a vaginal speculum with an illuminator. The bottom of the paper cap is cut with sterile scissors, the cap is moved towards the pusher handle and the instrument is inserted into the cervix as far as it will go. Then the pusher with the swab is inserted into the cervical canal, turned in both directions for better soaking of the swab with mucus, the pusher with the swab is pulled into the tube, the instrument and the speculum are taken out. A paper cap is put on the tube, which prevents the penetration of air microflora into the cavity of the tube, and the instrument is transferred to the workroom. Cultures are carried out as indicated above, while the swabs are not untied, but are cut with sterile scissors into a placed test tube with broth.

Cervical mucus sampling can also be performed *with instrument 1*. This uses a tip connected to a shaft and an internal safety tube. The technique for inserting the instrument is similar to the previous one.

Tool 3 is used to collect mucus from the vagina of cows. Before starting work, a swab made of a bandage or a piece of gauze measuring 10×12 cm is inserted into each tube, which is folded several times along the length and tied in the middle with a strong thread 55–60 cm long. The free end of the thread is passed through the tube and the swab is pulled through it to a depth of 8–10 cm. The rest of the thread is wound on the opposite end of the tube. The holes of the tubes are closed with paper caps, which are fixed with threads. The assembled tubes are

wrapped in packs of 10–12 pieces in paper. The ejectors are also wrapped in paper at the same time. The tool is sterilized in an autoclave.

Before using the tool, the cow is fixed and the external genitalia are cleaned. A separate tube is assigned to each animal, and one ejector is used, but after each use it is wiped with a swab soaked in alcohol. Before use, the caps are removed from the tube and the ejector is inserted into the tube. The tool is inserted into the vagina without a vaginal speculum, pushing it all the way into the front wall, then the swab is pushed into the vaginal cavity, and the tube with the ejector is taken out.

The tampons are left in the vaginal cavity for 90 minutes, after which they are removed with a thread, placed in test tubes, into which 5 ml of saline solution containing 0.3% formalin is poured in advance. Labels are attached to the test tubes and they are sent to the laboratory.

Note: In the event of a complication with spillage of formalinized solution directly at the farm, it is allowed to send swabs with mucus in tubes without this solution, but in packaging that prevents the mucus from drying out.

The device for obtaining mucus designed by A. N. Zhaboyedov is intended for obtaining mucus from the prepuce of bulls and cervical mucus in cows. It consists

of a rod, which is:

unscrewed from two halves, and from the inner and outer safety tubes, each of which is also screwed from two halves. At one end of the rod there is a channel with a side hole for fixing a gauze swab, at the other - a handle. Preparation and use of the device are similar to the preparation and use of instrument-1 from the set of V. V. Pavlovsky. The gauze swab is pulled into the rod using a thin wire or a stylet through the side hole and the remains are cut off with sterile scissors after the rod is in the inner tube in the most posterior position. To insert the device into the cavity of the foreskin a sterile vaginal speculum for sheep is used to expose the entrance to the foreskin.

For laboratory testing for trichomoniasis in endometritis or pyometra, vaginal exudate is taken using the branches of a vaginal speculum or a G.K. Korchak spoon-catheter (the spoon is inserted into the vagina and the mucous membrane is irrigated with saline through the channel in its handle. After 30–40 seconds, the washout is collected in a placed container), or using a special PS-1 device proposed by G.V. Kazeev. The device is a vaginal speculum for cows (heifers), the lower flap of which has a metal tube soldered to it, which serves as a handle. A test tube is inserted into the handle and held in it by a spring. The washout enters the test tube through a hole made in the lower flap and the sleeve.

A tube is soldered to the inside of the upper mirror flap, which connects to the Agali tap via a rubber tube and fitting. The Agali tap, in turn, connects to a syringe and a bottle.

A sterile test tube is inserted into the handle of the lower flap of the mirror, which is fixed with a spring. A 10 ml syringe is connected to an Agali tap, to which, in turn, rubber tubes 85 cm and 35 cm long are connected. The opposite end of the long tube is connected to the device, and the end of the short one is inserted

into a bottle with saline solution. After that, saline solution is drawn into the syringe. After appropriate treatment of the external genitalia of the cow, the device, moistened with saline solution, is inserted into the vagina. The flaps are opened and a strong jet of saline is injected into the cervical area from the syringe. For better washing of the vagina, the flaps of the device are slightly narrowed and turned 90° to the right and left. Then the front edge of the lower flap is raised so that the washout falls into the test tube.

The device is removed from the cow's vagina, the tube with the wash solution is removed from the handle and covered with a sterile cotton swab, and then a label is attached to it with the help of a rubber ring indicating the inventory number and the animal's nickname.

The obtained washes are examined on site or sent to the laboratory. After each wash, the device is thoroughly rinsed with warm water, then sterilized by boiling or flambéing.

However, it is not always possible to detect the pathogen in vaginal swabs, so it is better to obtain material by scraping the vaginal mucosa with a G.K. Korchak scarifier. To do this, the labia are opened with the fingers of the left hand, and the device is inserted into the vagina to the cervix with the right hand. 20–25 light reciprocating movements of the scarifier head are made from the cervix to the middle of the vagina. Then the device is removed and the collected mucus (2–3 ml) is washed off the head with sterile saline.

Considering that trichomonads parasitize in the uterine cavity and may be absent in the vaginal contents when the cervical canal is closed, it is recommended to administer 2–3 ml of a 1% solution of sinestrol or 2 ml of a 0.5% solution of proserin subcutaneously to the cow 24 hours before sampling.

The obtained material is sent (in test tubes, a thermos or other container with ice) to the laboratory for cultural examination no later than 6 hours after collection, or microscopy is performed on site.

Task 7. Diagnose **complications** of dysfunctions and inflammatory processes of the female genital organs.

Explanation for the lesson. *Uterine atrophy* – a sharp decrease in the volume of the organ. It can be senile, congenital or pathological. In old animals, it develops during the climacteric period, when the ovaries cease to function, sexual cycles stop, and the uterus decreases with simultaneous thinning of the walls and deep changes in the endometrium.

Pathological uterine atrophy occurs in young animals due to inadequate feeding, unsatisfactory conditions of detention, especially in the absence of walks. The most common associations are: ovarian hypofunction uterine atrophy; ovarian atrophy uterine atrophy; ovarian cyst uterine atrophy; ovarian sclerosis uterine atrophy; chronic endometritis uterine atrophy.

The diagnosis is made after taking a history, which initially reveals incomplete (arrhythmic and anovulatory) sexual cycles, and then anaphrodisia and a rectal examination, which reveals a noticeably reduced uterus with thinned atonic walls. The ovaries are reduced, dense, without corpora lutea and follicles.

Ovarian atrophy is a significant decrease in the volume of the ovaries with a weakening or cessation of their function. It can be unilateral or bilateral. It is more often recorded in old animals (physiological atrophy), after severe debilitating diseases, intoxications, compression of ovarian tissues by cysts or persistent corpora lutea that develop in them (pathological atrophy).

In young animals, it occurs as a result of inadequate feeding. It is manifested by atresia of existing follicles with cessation of growth of new follicles. The size of the parenchyma and stroma decreases, some of the blood vessels collapse, and the generative and hormonal function of the ovaries is disrupted. Depending on the strength and duration of the etiological factor, different depths of dystrophic processes develop, and the described changes in the ovaries are reversible or irreversible. In the first case, after eliminating the cause that caused the atrophy, if it has not reached a high degree, a complete restoration of the structure and function of the ovary is possible. In the latter case, the ovarian tissue is replaced by connective tissue, and the function is completely stopped.

To make a diagnosis, anamnestic data and a thorough rectal examination are used. It is taken into account that at the beginning of the development of atrophic processes in the ovaries there may be arrhythmic alibido-anestrua sexual cycles, or cycles without sufficiently pronounced estrus and sexual desire. If the processes of ovarian atrophy do not stop, anaphrodisia occurs. The ovaries are reduced to the size of a pea, sometimes flat, smooth, without follicles and yellow bodies on the surface, have an elastic or dense consistency. The uterus is reduced, atonic.

Ovarian sclerosis is the replacement of the follicular layer of the ovaries with connective tissue. The cause of ovarian sclerosis is inflammation of the interstitial tissue with its subsequent hyalinization (due to cystic degeneration, especially in polycystic ovary syndrome, prolonged persistence of corpora lutea, ovarian hypofunction, oophoritis, prolonged intoxication of the body), compression of the ovarian parenchyma and stroma and their atrophy. The ovaries are reduced, have a tubercular surface, a dense and even stony consistency, a rounded or indefinite shape. With intensive development of connective tissue, the ovaries may be enlarged. Folliculogenesis and luteogenesis are impaired. Anaphrodisia. Atony gradually develops and then atrophy of the uterus.

Cervical induration is a proliferation of connective tissue with simultaneous atrophy of muscle cells, as a result of which the cervical canal narrows and becomes impassable. It is a consequence of injuries and inflammatory processes.

It manifests itself as infertility. Rectal examination reveals enlargement, deformation and restriction of cervical mobility. It has a dense, sometimes stony consistency. Sometimes crepitation is observed, which is caused by calcification. When examining the cervix through a vaginal speculum during estrus, the cervical canal is closed. The uterus may be enlarged due to the accumulation of secretion in its cavity. Sexual cyclicity may be preserved. To clarify the diagnosis, probing of the cervical canal can be performed.

Task 8. Diagnose neoplasms of the female genital organs.

Explanation to the lesson: Neoplasms in the external genitalia and vagina are most often recorded in dogs.

Benign neoplasms are localized on the lower, upper or lateral walls of the vestibule of the vagina or vagina, have a rounded shape, often a thin leg, quite freely protrude into the lumen of the vagina and are easily diagnosed during vaginal examination. Tumors of the labia are also found. Lipoma develops under the mucous membrane, sometimes reaches large sizes, stretches and protrudes the perineum.

Malignant neoplasms are characterized by tissue breakdown, which is accompanied by bloody, sometimes purulent-bloody mucous discharge with a crumbly mass and an unpleasant odor. With significant growth, the malignant tumor extends beyond the genital slit in the form of a tubercular, bleeding mass, resembling cauliflower in shape.

Sticker's venereal sarcoma affects dogs of all ages (more often in middle age, but it also occurs in bitches who have never had sexual intercourse), is contagious and is transmitted during mating. Sebaceous single or multiple growths of the tumor are localized on the mucous membrane of the lower or lateral walls of the vestibule of the vagina, in the clitoris area. The dog often licks the vulva. When the tumor grows around the external opening of the urethra, the urethra is compressed and therefore the dog urinates frequently and in small portions. In advanced cases, a dirty cherry-colored bloody fluid is released from the external genitalia. If the neoplasm grows deeper and covers a significant surface of the vestibule of the vagina, the labia enlarge and a gaping of the genital slit is detected, through which part of the tumor can sometimes be seen. The diagnosis is made by vaginal examination, which is preferably performed with rubber gloves. A vaginal speculum can be used. Attention is paid to the location of the tumor, the degree of involvement of the urethra and mucous membrane.

Neoplasms in the cervix are also benign and malignant; they are more often localized on the mucous membrane of the vaginal part of the cervix. They can develop from hypertrophied folds of the mucous membrane of the cervical canal in chronic cervicitis. Polyposis is recorded growth of very long strands 3-4 mm thick from the cervix. *Diagnosis* is based on data from vaginal and rectal examinations.

Uterine neoplasms are rare and can be benign (fibroma, myoma, fibromyoma, leiomyoma, myxoma) and malignant (sarcoma, fibrosarcoma, carcinoma, and others).

The main sign of uterine tumor is infertility. The sexual cycle is disturbed. Rectal examination reveals an enlarged and nodular uterus of dense consistency, the mobility of which may be limited. Sometimes adhesions are palpated. In the case of a large tumor, vibration of the middle uterine artery is felt.

neoplasms affecting smooth muscle (leiomyoma and fibromyoma) are mainly recorded. They are localized mainly in the body of the uterus. With uterine neoplasms, the abdomen is quite characteristically enlarged. By palpation through the abdominal walls, an enlarged, sometimes hard uterus is found. The diagnosis is clarified by diagnostic puncture or after laparotomy. Adenocarcinoma of the uterus is very rare, which manifests itself as bloody discharge from the genitals, and in the case of metastases to various organs, a violation of the general condition of the animal.

Ovarian neoplasms are more often recorded in cows (fibromas, adenomas, leukomas, sarcomas, carcinomas, adenofibromas, leukosarcomas, etc.) and bitches (granulosa cell tumor, adenoma, teratocarcinoma). With rectal palpation, carried out at short intervals, an ovary is found, which is rapidly increasing and, under the weight of the growing tissues, can descend into the abdominal cavity. However, the size and shape of the uterine horns remain unchanged. The middle uterine artery does not vibrate. Anaphrodisia. In the case of a malignant neoplasm, progressive weight loss of the animal, anemia of visible mucous membranes, loss of shine of the hair coat are noted.

In dogs, granulosa cell tumors provoke hypersecretion of steroid hormones and can cause glandular-cystic endometrial hyperplasia or other uterine lesions. There may be deterioration of the general condition, weight loss, loss of luster and hair loss in symmetrical areas of the body, signs of endometritis, uterine degeneration, premature onset of pustules.

The diagnosis can be made by palpation or ultrasound.

Questions for self-control

1. Name the main pathogens of nonspecific inflammation of the genitals?
2. What is the mechanism of action of novocaine?
3. What are the consequences of using molecular iodine and other irritants in chronic endometritis?
4. What are the consequences of using archaic measures on infertile cows: enucleation of the corpus luteum and crushing of follicular cysts?
5. Make a plan-scheme for the complex treatment of a cow suffering from chronic purulent-catarrhal endometritis?

Reporting form: testing in a mudli

Recommended literature

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