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MORPHOLOGICAL AND HISTOLOGICAL CHARACTERISTICS OF THE ENDOMETRIUM OF THE UTERUS OF COWS WITH CATARRHAL ENDOMETRITIS

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The article presents the results of the study of the pathomorphological state of the endometrium in cows with catarrhal endometritis in Kostanay region. Based on studies of tissues of reproductive organs in cows at the age of 4 to 7 years with catarrhal endometritis, it was found that in the structural organization of the endometrium in cows, dystrophic processes of the integumentary epithelium, glandular pits with vacuolization and pyknosis of their nuclei were observed. The terminal sections of the alveolar glands of the endometrial mucosa are lined with a single-layer double-row epithelium. In the epithelium, there are simultaneously high prismatic secretory cells, enlarged in volume due to secret granules, and large, rounded cells with a large volume of light cytoplasm and a round nucleus located in the center of the cell. The mucous membrane of the uterus with catarrhal endometritis is hyperemic, during histological examination, infiltration of the mucous membrane by plasma cells, emigration of leukocytes was noted. Polypous thickening of the uterine mucosa is detected.

Key words: cattle; endometrium; histology; morphology.

МОРФОФУНКЦИОНАЛЬНАЯ ХАРАКТЕРИСТИКА ЭНДОМЕТРИЯ МАТКИ КОРОВ ПРИ КАТАРАЛЬНОМ ЭНДОМЕТРИТЕ

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В статье приведены результаты изучения патоморфологического состояния эндометрия у коров при катаральном эндометрите в Костанайской области. На основании исследований тканей репродуктивных органов у коров в возрасте от 4 до 7 лет при катаральном эндометрите установлено, что в структурной организации эндометрия у коров наблюдались дистрофические процессы клеток покровного эпителия, железистых ямок с вакуолизацией и пикнозом их ядер. Концевые отделы альвеолярных желез слизистой оболочки эндометрия выстланы однослойным двурядным эпителием. В эпителии одновременно встречаются высокие призматические секреторные клетки, увеличенные в объеме за счет гранул секрета и крупные, округлые клетки с большим объемом светлой цитоплазмы и круглым, расположенным в центре клетки ядром. Слизистая оболочка матки при катаральном эндометрите гиперемирована, при гистологическом исследовании отмечена инфильтрация слизистой оболочки плазматическими клетками, гиперемия, эмиграция лейкоцитов. Обнаруживаются полипозные утолщения слизистой оболочки матки.

Ключевые слова: крупный рогатый скот; эндометрий; гистология; морфология.

КАТАРАЛЬДЫ ЭНДОМЕТРИТТЕГІ СИЫР ЖАТЫРЫНЫҢ ЭНДОМЕТРИЯСЫНЫҢ МОРФОЛОГИЯЛЫҚ ЖӘНЕ ГИСТОЛОГИЯЛЫҚ СИПАТТАМАСЫ

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Мақалада Қостанай облысындағы қатаральды эндометритпен сиырлардағы эндометрияның патоморфологиялық жағдайын зерттеу нәтижелері келтірілген. Қатаральды эндометрит кезінде сиырлардағы репродуктивті органдардың кешенді зерттеу үшін 4 пен 7 жас негізінде сиырлардағы эндометрияның құрылымдық ұйымында эпителий жасушаларының дистрофиялық процестері, олардың ядроларының вакуолизациясы мен пикнозы бар безді шұңқырлар байқалғаны анықталды. Эндометрия шырышты қабығының альвеолярлы бездерінің соңғы бөліктері бір қабатты екі қатарлы эпителиймен қапталған. Эпителийде бір мезгілде секреция түйіршіктері арқылы көлемі ұлғайған жоғары призматикалық секреторлық жасушалар және үлкен цитоплазманың үлкен көлемі және жасушаның ортасында орналасқан дөңгелек ядросы бар үлкен, дөңгелек жасушалар кездеседі. Жатырдың шырышты қабаты қатаральды эндометритпен гиперемияланған, гистологиялық зерттеу кезінде шырышты қабықтың плазмалық жасушалармен инфильтрациясы, гиперемия, лейкоциттердің эмиграциясы байқалады. Жатырдың шырышты қабығының полипозды қалыңдауы анықталады.

Түйінді сөздер: ірі қара мал; эндометрия; гистология; морфология.

Introduction. According to a number of authors, functional disorders of the genital apparatus occupy an important place in the list of gynecological diseases [1, P. 47].

In the postpartum period dairy cows face both physiological and pathological problems. Childbirth significantly damages the endometrium of the uterus, which leads to microbial infection in 80-100% of cases. When inflammation and infection caused by pathogens cannot be controlled by the immune system, cows develop diseases of the reproductive system. Endometritis usually occurs between 21 and 60 days after childbirth. Catarrhal endometritis occurs in 20-30% of dairy cows, so the probability of culling is 1.7 times higher. From an economic point of view, endometritis leads to the fact that dairy farmers annually incur financial losses and costs for the treatment of cows, reduction of milk production, replacement and culling of animals unable to conceive. Indicators of the degree of insemination of cows with catarrhal endometritis are 20% lower than in healthy cows. They require up to 10% additional insemination per conception, which leads to an increase in calving intervals [2, P.2185].

Bacterial infection in the epithelial layer of the endometrium of cows causes inflammation, histological damage and delays the involution of the uterus. These pathogens damage the endometrium and are the cause of endometritis [3].

Clinical endometritis of dairy cows is defined as mucopurulent or purulent vulvar discharge 21 days or more after parturition. The diagnosis of clinical endometritis is commonly based on vaginal examination.

Considering only the presence of aerobic uterine pathogens and a proportion of PMN above the threshold values of 5 and 18% as indicative for endometritis, a proportion of 17.3 and 28.5%, respectively, diagnoses by vaginoscopy were false positive [4, P.1248].

A good management and precocious diagnosis of the pathologies is not resolute to restore good fertility parameters and understanding the immune response in first-lactation cows may be of value for developing alternative intervention protocols for older-lactation cows [5, P.1206].

Thus, the study of the pathomorphological state of the endometrium in clinically healthy cows and in catarrhal endometritis is undoubtedly relevant today.

In this regard, the aim of the research was to study the pathomorphological state of the endometrium of cows with catarrhal endometritis in Kostanay region.

Research objectives: to study macroscopic, histological and functional changes in the uterine wall of cows with catarrhal endometritis.

Materials and methods of research. The material for the study of morphometric indicators was the organs of the reproductive system from cows kept in the same conditions with the same feeding at the age of 4 to 7 years.

The following research methods were used in the work:

- histological studies of the tissues of the reproductive system of clinically healthy cows and in pathology (fixation in formalin 10%. filling in paraffin, hematoxylin-eosin staining, cytometry).

- work with equipment for preparation, filling, coloring of histological sections. To identify the functional activity of epithelial cells, the cytoplasm area of the integumentary and glandular epithelium and their nuclei, nuclear-cytoplasmic relations of epithelial cells were determined.

The digital material was processed statistically using the computer program Excel, 2010.

Research results.

In a macroscopic examination of the uterus of cows with catarrhal endometritis, first of all, uneven coloring of the mucous membrane of the body of the uterus was noted. The wall of the uterus is pale pink in color, flabby in texture but compacted in some areas. There are areas with cystic formations. In some cases it is swollen, spotty hyperemic and in places dotted with hemorrhages.

The surface of the mucous membrane is covered with viscous, thick and difficult to wash off serous-mucous exudates with the presence of lumps of dead tissue in it. The lumen of the uterus is constantly filled with a mass containing purulent bodies, desquamated epithelium and leukocytes.

With catarrhal endometritis, the reproductive organs underwent significant changes, both in linear measurements and in the structure of tissues.

The integumentary epithelium of the endometrium is multi-row, single-layered, represented by cells of different sizes with basophilic cytoplasm of different densities. The basally located euchromic nuclei of the first row are oval elongated, mostly rod-shaped. The nuclei occupying the central position are darker, basophilic. Goblet-shaped cells are few, large, filled with light contents. The nuclei of goblet cells occupy a central position. During histological studies, an apocrine type of secretion of the cells of the uterine epithelium can be observed (Figure 1).

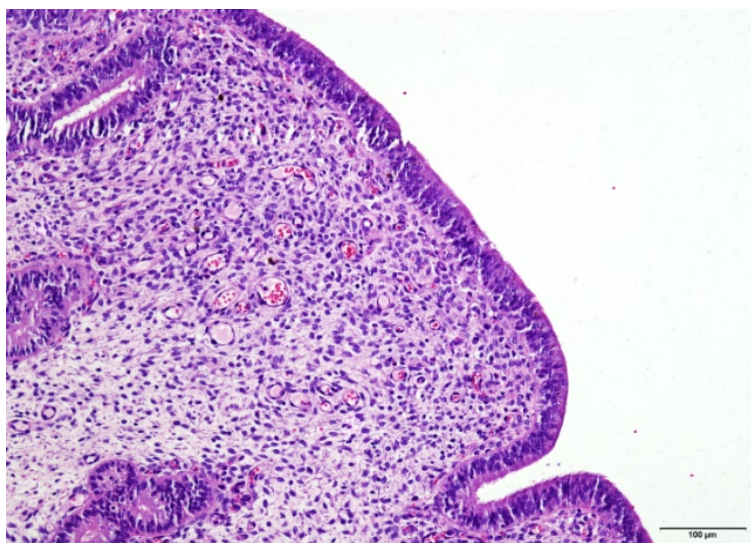


Figure 1 – Endometrial epithelium of the uterus of a clinically healthy cow (hematoxylin and eosin, X1000)

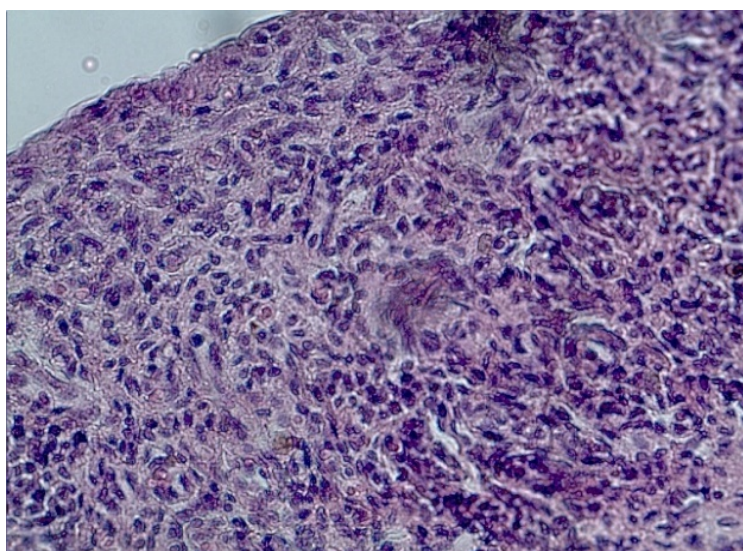


Figure 2 – Cow endometrium for catarrhal endometritis (hematoxylin and eosin, X 400).
Blockage of the excretory ducts of the glands, desquamation of the epithelium

The glandular epithelium is represented by a single-layer bilobal epithelium, with low prismatic cells. The uterine glands of cow endometrium in catarrhal endometritis were with varying degrees of damage. Oedema of the stroma was noted until complete destruction of the glandular epithelium and the

accumulation of single histocytic cells in it. The epithelium lining the inner surface of the uterine glands maintained its integrity. In addition, in catarrhal endometritis, the uterine glands were unevenly located, their lumen was slightly enlarged, the glandular epithelium was mononuclear, epithelial cells had a prismatic shape. Blockage of the outlet openings of the terminal glands was observed, as well as ulceration and swelling of the mucous membrane. Growth of uterine connective tissue occurred with displacement of muscle tissue. The lumens of the glands are sharply expanded. Individual end departments are filled with exudate. Atrophic processes of glandular epithelium are pronounced (Figure 3)

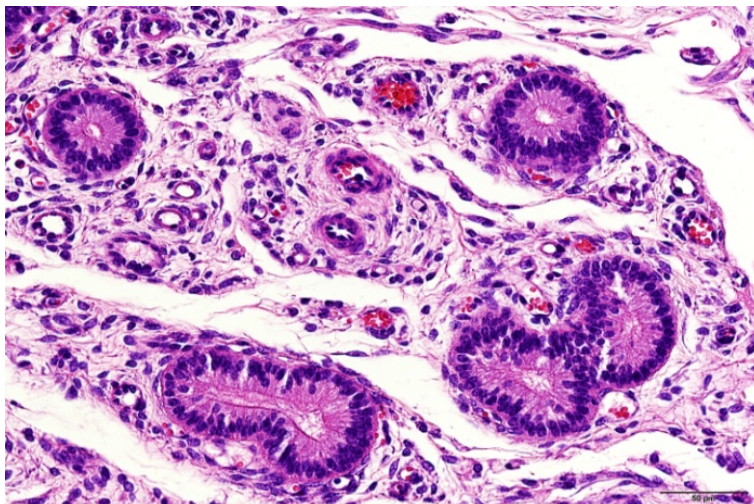


Figure 3 – Endometrial glands of a clinically healthy cow (hematoxylin and eosin, X1000)

The terminal glands of the endometrium of the uterus of cows are lined with a single-layer bilobial epithelium. In the epithelium, there are high prismatic secretory cells, increased in volume due to secretion and large, rounded cells with a large volume of protoplasm and round, located in the center of the cell (Figure 3). Mitoses were noted in exocrinocytes for histological examination of the endometrium. There is an accumulation of secretion in the lumens of the glands.

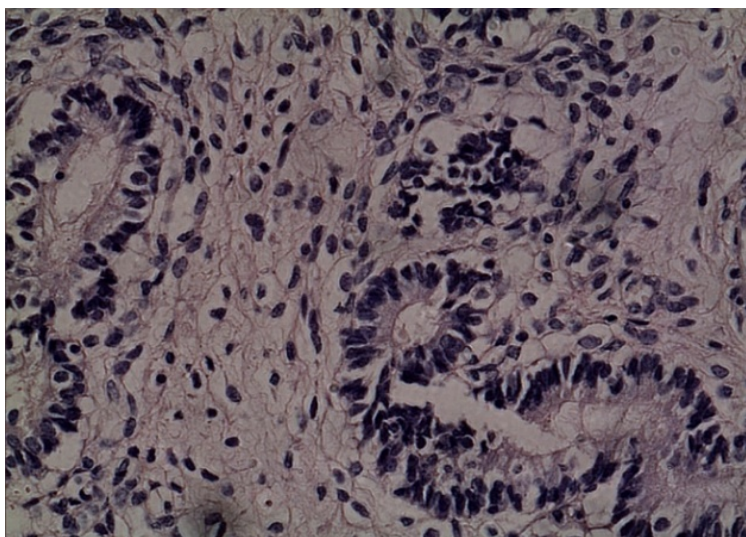


Figure 4 – Glandular epithelium of the right uterine horn in catarrhal endometritis (hematoxylin and eosin, X1000).

Dilation of the excretory ducts and blockage of the lumen of the endometrial glands of cows

Uterine endometrial glands in catarrhal endometritic atrophy. The excretory ducts of the glands are blocked with exudate with fragments of destroyed cells. The terminal glands are dilated due to overfilling with exudate. Flattened exocrinocytes. The nuclei are small euchromic, many cells with pycnotic nuclei have been found. Protoplasm of an exocrinocytes is hyperchromic. Cystic gland dilation was recorded, expressed in various degrees (Figures 4).

The uterine glands in the thickness of the endometrial stroma of the uterus of cows with catarrhal endometritis were located with varying degrees of damage. Oedema of the stroma was observed, in places

until complete destruction of the glandular epithelium. The uterine gland epithelium maintained its integrity. In addition, in catarrhal endometritis, the uterine glands were unevenly located, their lumen was enlarged, the glandular epithelium was mononuclear, epithelial cells had a prismatic shape.

The internal diameter of the endometrial glands in catarrhal endometritis is 32.16 ± 14.40 microns. ($P \geq 0.001$) (from 14 to 59.3 microns). Glands with a small internal diameter predominate. The outer diameter of the endometrial glands was 59.99 ± 32.27 microns ($P \geq 0.01$) (from 31.2 to 158 microns). The glands are narrowed, a small group of glands with an average size is noted. The functional activity of endometrial cells is 0.431 ± 0.070 ($P \geq 0.01$) (from 0.300 to 0.610). A decrease in the nuclear-plasma ratio has been established.

Thus, on the basis of comprehensive studies of the tissues of the reproductive organs in cows with catarrhal endometritis, characteristic changes in the uterine mucosa have been established.

Hyperemia and polypous thickenings of the endometrium were macroscopically noted. Histological studies have shown infiltration of the mucous membrane by plasma cells, hyperemia, emigration of leukocytes.

In the structural organization of the endometrium in cows, dystrophic processes of the cells of the integumentary epithelium, glandular pits with vacuolization and pyknosis of their nuclei were observed. The terminal sections of the tubular – alveolar glands of the uterine mucosa of cows are lined with a single-layer double-row epithelium. In the epithelium, there are simultaneously high prismatic secretory cells, enlarged in volume due to secret granules, and large, rounded cells with a large volume of light cytoplasm and a round nucleus located in the center of the cell.

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