

CAUSES OF PATHOLOGICAL CHANGES IN THE DOGS' AND CATS' UTERUS

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Abstract. *Our analysis of macro preparations and microscopic observation of histological sections of uterus have shown that in case of chlamydia or mycoplasma infection even clinically healthy animals have observed changes in the tissues of the uterus in the form of degeneration, hyperplasia and fibrosis. The consequence of chronic inflammation of chlamydia and mycoplasma infections is the thickening of affected mucosal tissue, epithelial metaplasia in multi-flat epithelium, followed by growth of connective scar tissue. This leads to future infertility or acute endometritis when joining secondary microflora. In animals with obstetric and gynecological pathology diagnosed with chlamydia and mycoplasma infections are characterized by proliferative, degenerative and necrotic changes in all layers of the uterus, changes in the form of cystic or chronic lymphocytic endometritis. Chlamydia and mycoplasma infections not only cause inflammatory diseases of the genital organs, but are a pathogenetic factor in the tumors of the uterus. Clinically healthy animals without chlamydia and mycoplasma infections doesn't have pathological changes in the uterus.*

Keywords: *infections, reproductive organs, dog, cat*

The relevance of the research is caused by that up to date, clinics of Veterinary Medicine receive a large number of cats and dogs females with various gynecological diseases (vaginitis, endometritis, pyometra, etc.). These diseases cause infertility, abortion, birth of weak, non-viable calves, and even stillbirth. [11] Etiology and pathogenesis of diseases of the reproductive organs of small animals, including the uterus, are not clarified, and methods of treatment and prevention are often not effective.

Analysis of recent research and publications. Diseases of the reproductive system of small household animals in different regions make up 12-20% of all diseases.

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According to some reports in recent years the number of genital inflammation increased by 45%. [3].

Growing problem of uterus lesions in female dogs and cats represents that the breeding and keeping of small animals often occurs without proper oversight by veterinarians and dog handlers and felinologists. Often the owners of the animals alone are seeking mating partners, make own decisions in the animals breeding, without taking into account their health, physiology, welfare or inheritance. [6] Often, the animals used for mating, can be carriers of pathogens of various infections [2, 7].

The studies of ukrainian and foreign scientists [11] emphasize that in recent decades, along with absolute pathogens (Chlamydia), opportunistic pathogens (bacteria, mycoplasma, viruses, fungi) play the most important role in the development of infectious - inflammatory processes in obstetrics and gynecology. These organisms have many common antigens from the tissues of the body-owner, hence the possibility of their direct involvement in the development of autoimmune diseases. Numerous studies have shown that the last decade we observe the growth of infectious processes associated with chlamydia and mycoplasma infection [12, 13].

Chlamydia infection is a classic antropozoonozom that is a constant threat to humans and animals due polifagism and plastycism of its pathogen [7, 9]. Chlamydia should be considered as a typical natural focal infection. At least 132 species of birds have Chlamydia infection. Respect other animals, Chlamydia affects 200 species.

For Chlamydia interspecies transmission is a common pattern that is a threat to humans which can be infected from infected birds and mammals [7, 6].

According to the literature, lesions of uterine infection in animals due to chlamydia and mycoplasma is about 10-20% of the investigated animals [3].

A necessary condition of inflammation is the infiltration and proliferation of microbial cells into cylindrical epithelium. Infection of the uterus may occur as exogenous (external) and endogenous (from the inside of the body) process. Often penetration of pathogenic and opportunistic microorganisms occurs by intrachannel ways: through the cervical canal on the surface of the endometrium to fallopian tubes and ovaries. Such bacteria contribute to sperm penetration, which act as "vehicles" for

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most bacteria and viruses. Passive transfer mechanism of bacteria from the lower to the upper genital tract to the present time is in discussion. In addition of intrachannel way, a possible alternative of infection may be through regional or main blood and lymph vessels, and in case of direct contact of inflammatory abdominal cavity with the uterus. In such cases, the internal sexual organs are involved secondarily in the pathological process. [2, 8, 4]

If case of chlamydia and mycoplasma infection characteristic changes of internal organs are present. In particular, there are changes in the structural components of the endometrium both in acute and in chronic disease periods. The most significant changes relate to the epithelial layer of the mucous membrane and the endothelium of blood vessels [11]. Changes in the uterus in the early stages of chlamydia and mycoplasma infection is almost unknown.

The purpose of the research is to identify changes in the structure of the uterus of female dogs and cats with diagnosed or not diagnosed chlamydia and mycoplasma infection.

Materials and methods. Uterus for the research we received by ovariohysterectomy pursued by the castration of healthy female dogs and cats, as well as surgical treatment of animals in the event of obstetric and gynecological diseases. All animals were tested for the presence of chlamydia or mycoplasma infection.

Results and discussion. We studied a total of 5912 animals (dogs and cats), of which 2471 (41.8%) were clinically healthy animals that applied for sterilization or immunization. 3441 animal patients were with various diseases. In case of history and clinical examination of 192 animals we found certain signs of diseases of the reproductive system, which is 5.6%. Of these, 174 – females with obvious signs of obstetric and gynecological pathology (vaginitis, endometritis, pyometra, pathological families infertility) and 18 males - with obvious signs of inflammation of the genital organs (urethritis, balanoposthitis, etc.).

Chlamydia were present in 18.4% of the animals, and their association with mycoplasma – in 30.2%. According to our previous studies, mostly in 37.2% of the

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studied cats and female dogs that had various obstetric and gynecological diseases, we found blood mycoplasma.

During this time we held sterilization of 483 clinically healthy females, of which 52 – dogs and 431 cats. In the ovariohysterectomy of these animals aged 8 to 24 months, in 84% of animals we have observed changes in the uterus, invisible from the outside.

Research animals were divided into three groups. The first group (n = 5) included clinically healthy animals in which were not found chlamydia and mycoplasma infection. The second (n = 5) – clinically healthy animals diagnosed with chlamydia and mycoplasma infections. The third (n = 5) – animals with obstetric and gynecological pathology and diagnosed chlamydia and mycoplasma infection.

Regarding of our experiment, macroscopic study of females animals of the first group revealed no observed lesions (Figure 1).



Fig. 1. Appearance of uterus of clinically healthy female dog without chlamydia and mycoplasma infection

During histological studies we have noted that the wall of the uterus was without pathological changes in the phase of secretion or proliferation. We could clearly observe structural elements: endometrium, myometrium and perimeter (Figure 2).

In myometrium we see vascular and submucosal layer. In endometry we see many glands of right round and elongated shape, the epithelium is high, the nuclei of cells are light, round with clear nucleolus. Endometrial stroma looks like delicate thin fibers, stromal cells are spindle-shaped, with little cytoplasm.

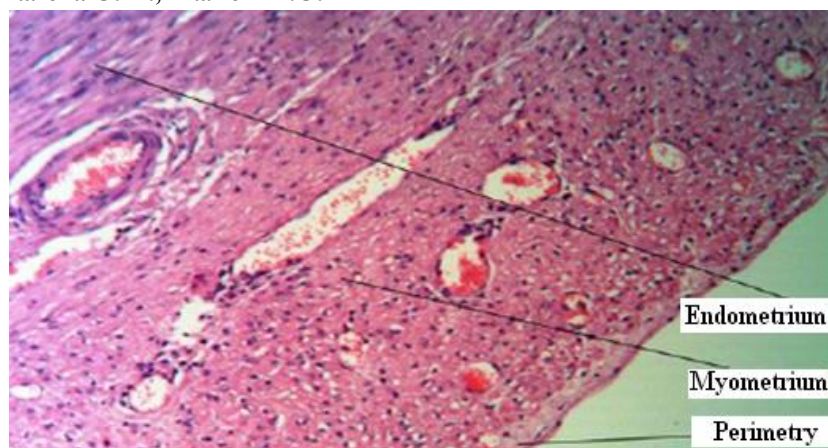


Fig. 2. Membrane of the uterus of clinically healthy dogs without chlamydia and mycoplasma infection

Endometrial histological structure is changed due to hormonal influence, especially seen in functional layer. (Fig. 3)

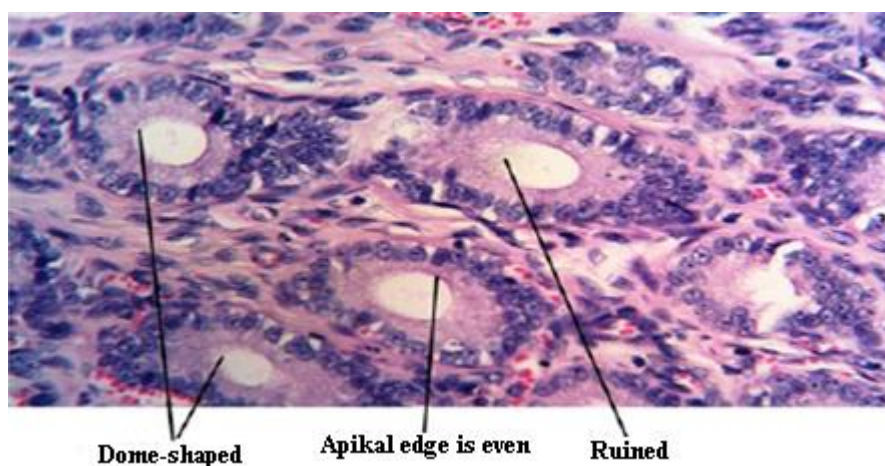


Fig. 3. Dome-shaped, unequal apical edge of the epithelial cells of the endometrium during the secretion phase, norm

In the animals of second group we observed that its uterus is visually modified, deformed. Uterine wall is thickened, condensed, rough, cavity had small amount of fluid, endometrium swollen, in a state of congestion (Fig. 4, 5).

For histological examination of the uterus animals of the second group showed morphological changes: signs of fibrosis (sclerosis) (Fig. 6); hyperemia and edema of the endometrium (Fig. 7); endometrial hyperplasia (Fig. 8). Was noted the edema of the vascular layer of the myometrium. The blood vessels overflowing with blood. Stroma basal layer of the endometrium was dense with a large number of connective tissue

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cells. Cystic dilated glands were observed in a row of dark low epithelium, and the secretion is present in the lumen.



Fig. 4. The uterus of clinically healthy cat diagnosed with mycoplasma infection. Chronic endometritis, sclerosis (fibrosis)



Fig. 5. The uterus of clinically healthy dog diagnosed with chlamydial infection. Chronic endometritis. Hyperemia and edema of the endometrium

Endometrial stroma is dense, reticular cells are fusiform or stellate with a large nucleus. Stromal fibrosis is determined. Mucosal surface is uneven, with formations in the lumen of the uterus. Epitelial cells are observed in the lumen.

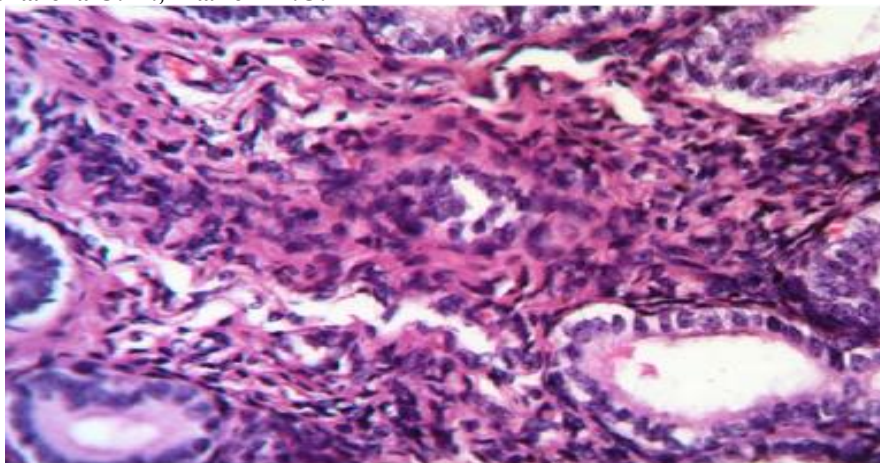


Fig. 6. The structure of the uterus of animals of the second experimental group. Diffuse sclerosis of the stroma, microscopic sign of chronic endometritis (areas of dense connective tissue, vasoconstriction and their obliteration)

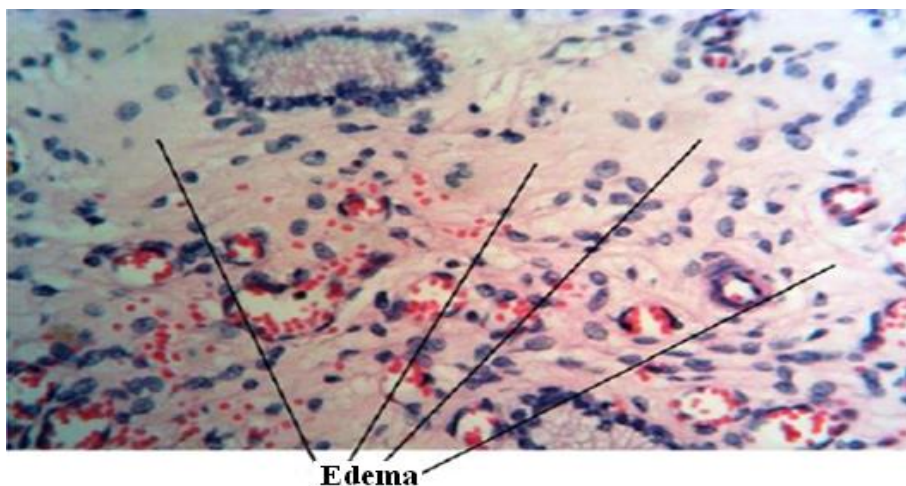


Fig. 7. The structure of the uterus of animals of the second experimental group.

Hyperemia and edema of the endometrium, overflow of the venous blood, red blood cells in the stroma, a significant increase in the width of the endometrium, violation of the integrity of connective tissue fibers and disappearance of its density.

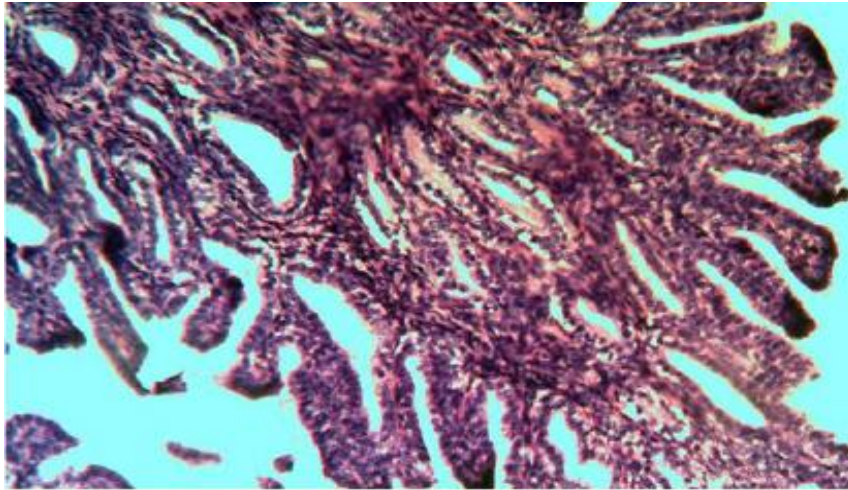


Fig. 8. The structure of the uterus of animals of the second experimental group. Hyperplasia endometrial, uterine glands are elongated, and they form a grow endometrial

In the third group of animals on ovariohysterectomy we removed the uterus, filled with pus or spread out and decomposed fetus (Fig. 9, 10).



Fig. 9. A pyometra in dogs of the third experimental group



Fig. 10. Decomposed fetus in the uterine horn of females of the third experimental group

For histological uterus examination of females of third experimental group (Fig. 11.12), we observed signs of chronic endometritis, namely the presence of lymphocytic infiltrates in the basal layer of the endometrium, focal hemorrhages, multiple sclerosis stroma, hyperemia and edema of the endometrium. Vessels of the myometrium are crushed, prolonged in the form of narrow slots, some of them are filled with a cell mass, or expanded and filled with blood. Layers of endometrium are not differentiated, glands are expanded, destroyed, oral glands merge, forming cysts. Cysts are filled with secretions and cells. In the endometrium there are diffuse and focal cell infiltrates, including macrophages and plasma cells. Epithelial cells of glands are low, light, with a pronounced dark centrally located nucleus. There are many infiltrations, composed of lymphoid cells and plasma cells, and also polymorphonuclear leukocytes and histiocytes.

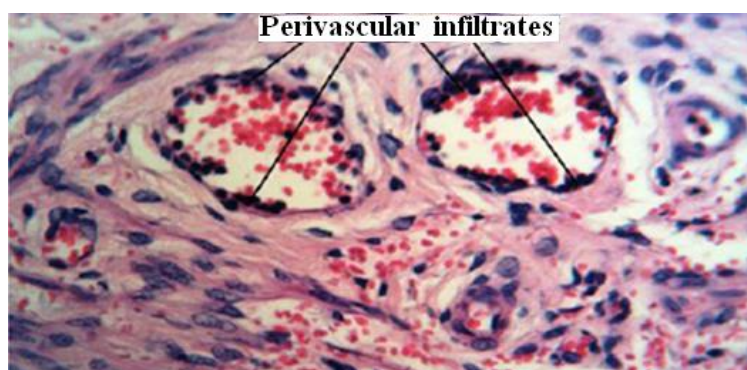


Fig. 11. Lymphocytic infiltrations around blood vessels of endometrium in the third experimental group of animals

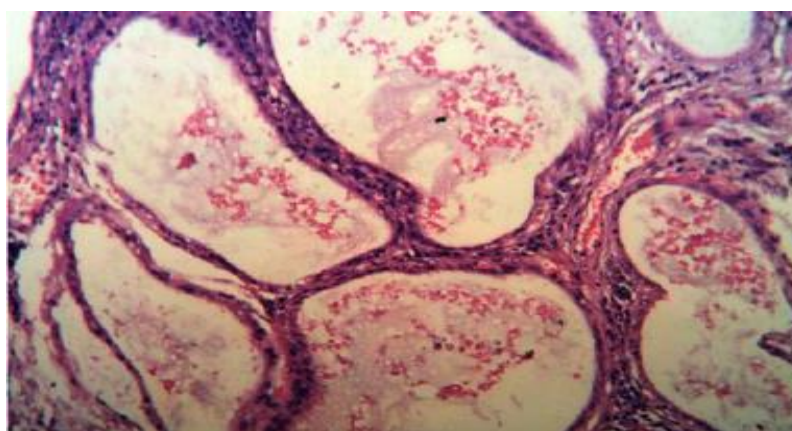


Fig. 12. The uterus of the third experimental group of animals. Chronic cystic endometritis

The 2 females with signs of endometritis by histological examination revealed glandular-cystic endometrial hyperplasia with areas of adenocarcinoma (Fig. 13).



Fig. 13. The uterus of the third dog of the research group with glandular-cystic endometrial hyperplasia and adenocarcinoma areas

In conclusion, our analysis of macro preparations and microscopic observation of histological sections of uterus have shown that in case of chlamydia or mycoplasma infection even clinically healthy animals have observed changes in the tissues of the uterus in the form of degeneration, hyperplasia and fibrosis. The consequence of chronic inflammation of chlamydia and mycoplasma infections is the thickening of affected mucosal tissue, epithelial metaplasia in multi-flat epithelium, followed by growth of connective scar tissue. This leads to future infertility or acute endometritis when joining secondary microflora. In animals with obstetric and gynecological pathology diagnosed with chlamydia and mycoplasma infections are characterized by proliferative, degenerative and necrotic changes in all layers of the uterus, changes in the form of cystic or chronic lymphocytic endometritis. Chlamydia and mycoplasma infections not only cause inflammatory diseases of the genital organs, but are a pathogenetic factor in the tumors of the uterus. Clinically healthy animals without chlamydia and mycoplasma infections doesn't have pathological changes in the uterus.

Further research perspective is to develop methods for early diagnosis and effective treatment for female chlamydia and mycoplasma infections.

Conclusions and prospects for further research

1. In clinically healthy animals, when they have chlamydia or mycoplasma infection, marked changes in the tissues of the uterus in the form of degeneration, hyperplasia, fibrosis.

2. The result of a prolonged chronic inflammatory process in chlamydial and mycoplasmal infections is thickening of the affected mucosa, metaplasia of epithelial cells in the multilayered flat epithelium with subsequent overgrowth of connective scar tissue.

3. In animals with obstetric and gynecologic pathology identified mycoplasma and chlamydial infections detected characteristic proliferative, degenerative and necrotic changes in all layers of the uterus, changes in the cystic or chronic lymphocytic endometritis.

4. Clinically healthy animals without chlamydial and mycoplasmal infections of pathological changes in the uterus have not.

The prospect of further researches is development of methods for early diagnosis and effective treatment of females with chlamydial and mycoplasmal infections.

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ПРИЧИНИ РОЗВИТКУ ПАТОЛОГІЧНИХ ЗМІН У МАТЦІ СУК ТА КІШОК

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***Анотація.** Проведений нами аналіз макропрепаратів і мікроскопічний аналіз гістологічних зрізів маток показав, що у клінічно здорових тварин у разі виявлення у них хламідійної або мікоплазмової інфекції відмічаються зміни в тканинах матки у вигляді дистрофії, гіперплазії, фіброзу. Наслідком хронічного довготривалого запального процесу за хламідійної і мікоплазмової інфекцій є потовщення враженої слизової оболонки, метаплазія епітеліоцитів в багаторядний плоский епітелій з наступним розростанням сполучно-рубцевої тканини. Це в майбутньому призводить до непліддя або гострого ендометриту у разі приєднання вторинної мікрофлори. У тварин з акушерською та гінекологічною патологією з виявленою хламідійною і мікоплазмовою інфекціями виявляються характерні проліферативні, дистрофічні і некротичні зміни у всіх шарах матки, зміни у вигляді кістозного або хронічного лімфоцитарного ендометриту. Хламідійна і мікоплазмозна інфекції викликають не тільки запальні захворювання статевих органів, але є фактором патогенезу новоутворень матки. Клінічно здорові тварини без хламідійної і мікоплазмової інфекцій патологічних змін у стінці матки не мають.*

***Ключові слова:** інфекції, репродуктивні органи, сука, кішка*

ПРИЧИНЫ РАЗВИТИЯ ПАТОЛОГИЧЕСКИХ ИЗМЕНЕНИЙ В МАТКЕ СУК И КОШЕК

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Анотация. Проведенный нами анализ макропрепаратов и микроскопический анализ гистологических срезов тканей маток показал, что у клинически здоровых животных при выявлении у них хламидийной и микоплазменной инфекции отмечаются изменения в тканях матки в виде дистрофии, гиперплазии, фиброза. Следствием хронического длительного воспалительного процесса при исследуемых инфекциях есть утолщение пораженной слизистой оболочки, метаплазия эпителиоцитов в многорядный плоский эпителий с последующим разрастанием соединительно-рубцовой ткани. Это в будущем приводит к развитию бесплодия или острого эндометрита при присоединении вторичной микрофлоры.

У животных с акушерской и гинекологической патологией с выявленной хламидийной и микоплазменной инфекциями были обнаружены характерные пролиферативные, дистрофические и некротические изменения во всех слоях матки, изменения в виде кистозного или хронического лимфоцитарного эндометрита. Хламидийная и микоплазменная инфекции вызывают не только воспалительные заболевания половых органов, но и выступают фактором патогенеза новообразований матки. Клинически здоровые животные без хламидийной и микоплазменной инфекций патологических изменений не имеют.

Ключевые слова: инфекции, репродуктивные органы, собака, кошка