Bitanova Elmira Zhenyskhanovna – Candidate of Medical Sciences, Senior Researcher, Antigen Research and Production Enterprise LLP, Republic of Kazakhstan, 040905, Almaty region, Karasai district, Abai village, 4 Azerbayeva Str., tel.: +7-707-964-83-84, e-mail: elmira.bitanova@mail.ru.

Ustenova Gulbaram Omargaziyevna – Doctor of Pharmaceutical Sciences, Professor of the Department of pharmaceutical technology, S.D. Asfendiyarov Kazakh National Medical University, Republic of Kazakhstan, 050000 Almaty, 94 Tole Bi Str., tel.: +7-707-307-21-74, e-mail: ustenova@list.ru.

IRSTI 68.41.33
UDC 619:616-006.6
https://doi.org/10.52269/22266070_2025_1_58

CLINICAL AND MORPHOLOGICAL MANIFESTATIONS OF BREAST TUMORS IN CATS

Murzakayeva G.K. – PhD, Senior Lecturer of the Department of veterinary sanitation, S.Seifullin Kazakh Agro Technical Research University NCJSC, Astana, Republic of Kazakhstan.

Yergazina A.M. – PhD, acting Associate Professor of the Department of veterinary medicine, Akhmet Baitursynuly Kostanay Regional University NLC, Kostanay, Republic of Kazakhstan.*

Aubakirov M.Zh. – PhD, Head of the Department of veterinary medicine, Akhmet Baitursynuly Kostanay Regional University NLC, Kostanay, Republic of Kazakhstan.

Paritova A.Y. – PhD, acting Associate Professor of the Department of veterinary sanitation, S.Seifullin Kazakh Agro Technical Research University NCJSC, Astana, Republic of Kazakhstan.

This research paper examines the issue of mammary tumors in cats, which is one of the most common oncological pathologies among domestic animals in Astana.In recent years, pet owners have become increasingly aware of breast cancer in animals. Proper care and attention enable early detection of malignant processes, significantly improving the chances of saving pet's life.

In recent years, awareness of owners about what breast cancer is has been rapidly growing. Attentiveness to your pet allows you to detect a malignant process at an early stage and helps save lives.

In this regard, our research was aimed at studying the clinical and morphological manifestations of mammary gland tumors in cats at the Zoosfera NGO, analyzing their distribution in cats, as well as analyzing hematological, ultradiagnostic, radiological and histological research methods.

The research purpose is to study the main clinical and morphological manifestations of mammary gland tumors in cats in the Zoosfera NGO, taking into account pathomorphological changes. To achieve this goal, an analysis of the incidence of mammary tumors in cats in Astana was carried out, and various diagnostic methods were evaluated, including hematological, ultrasound, radiological and histological studies.As part of the study, data from the clinic outpatient logs for the period from 2022 to 2024 was analyzed, and 15 cats with symptoms of the disease were examined. The research methods included clinical examination, ultrasound and x-ray diagnostics, biochemical blood tests, as well as pathological and histological examination of tissues.

The research findings will contribute to improvement of the diagnostics and treatment of mammary tumors in cats, increasing the chances of survival of pets if the disease is detected early.

Key words: *tumor, mammary gland, cats, diagnostics, pathomorphological changes, hyperplasia, mastopathy.*

МЫСЫҚТАРДАҒЫ СҮТ БЕЗІ ІСІКТЕРІНІҢ КЛИНИКАЛЫҚ-МОРФОЛОГИЯЛЫҚ КӨРІНІСТЕРІ

Мурзакаева Г.К. – PhD, ветеринариялық санитария кафедрасының аға оқытушысы, «С.Сейфуллин атындағы Қазақ агротехникалық зерттеу университеті» КЕАҚ, Астана қ., Қазақстан Республикасы.

Ергазина А.М. – PhD, ветеринариялық медицина кафедрасы қауымдастырылған профессорының м.а., «Ахмет Байтұрсынұлы атындағы Қостанай өңірлік университеті» КЕАҚ, Қостанай қ., Қазақстан Республикасы.*

Аубакиров М.Ж. – PhD, ветеринариялық медицина кафедрасының меңгерушісі, «Ахмет Байтұрсынұлы атындағы Қостанай өңірлік университеті» КЕАҚ, Қостанай қ., Қазақстан Республикасы.

Паритова А.Е. – PhD, ветеринариялық санитария кафедрасы қауымдастырылған профессорының м.а., «С.Сейфуллин атындағы Қазақ агротехникалық зерттеу университеті» КЕАҚ, Астана қ., Қазақстан Республикасы.

Бұл ғылыми жұмыста Астана қаласындағы үй жануарларының онкологиялық патологияларының бірі болып табылатын мысықтардың сүт бездерінің ісіктері мәселесі қарастырылған.

Соңғы жылдары сүт безі қатерлі ісігі туралы ақпараттылық үй жануарлары иелерінің арасында күрт өсуде. Үй жануарларына мұқият болу қатерлі процесті ерте кезеңде анықтауға мүмкіндік береді және оның өмірін сақтап қалуға көмектеседі.Осыған байланысты біздің зерттеу жұмысымыз «Зоосфера» ҚБ мысықтардағы сүт безі ісіктерінің клиникалық және морфологиялық көріністерін зерттеуге, олардың мысықтарда таралуын талдауға, сонымен қатар гематологиялық, ультрадиагностикалық, радиологиялық және гистологиялық зерттеу әдістерін талдауға бағытталды.

Зерттеудің мақсаты – патоморфологиялық өзгерістерді ескере отырып, «Зоосфера» қоғамдық ұйымында мысықтардағы сүт безі ісіктерінің негізгі клиникалық-морфологиялық көріністерін зерттеу. Осы мақсатқа жету үшін Астана қаласында мысықтар арасында сүт безі ісіктерінің таралуына талдау жүргізіліп, гематологиялық, ультрадыбыстық, рентгендік және гистологиялық зерттеулерді қамтитын әртүрлі диагностикалық әдістер бағаланды. Жұмыс аясында емхананың 2022-2024 жылдар аралығындағы амбулаториялық журналдарының деректері талданып, ауру белгілері бар 15 мысық тексерілді. Зерттеу әдістері

клиникалық тексеру, ультрадыбыстық және рентгендік диагностика, биохимиялық қан анализі, сондай-ақ тіндердің патологиялық және гистологиялық сараптамасы болды.

Зерттеу нәтижелері мысықтардағы сүт бездерінің ісіктерін диагностикалау мен емдеуді жақсартады, сондай-ақ ауру ерте анықталған жағдайда үй жануарларының тірі қалу мүмкіндігін арттырады.

Түйінді сөздер: *ісік, сүт безі, мысықтар, диагностика, патоморфологиялық өзгерістер, гиперплазия, мастопатия.*

КЛИНИКО-МОРФОЛОГИЧЕСКИЕ ПРОЯВЛЕНИЯ ОПУХОЛЕЙ МОЛОЧНОЙ ЖЕЛЕЗЫ У КОШЕК

Мурзакаева Г.К. – PhD, старший преподаватель кафедры ветеринарной санитарии, НАО «Казахский агротехнический исследовательский университет имени С.Сейфуллина», г. Астана, Республика Казахстан.

Ергазина А.М. – PhD, и.о. ассоциированного профессора кафедры ветеринарной медицины, НАО «Костанайский региональный университет имени АхметБайтұрсынұлы», г.Костанай, Республика Казахстан.*

Аубакиров М.Ж. – PhD, заведующий кафедрой ветеринарной медицины, НАО «Костанайский региональный университет имени Ахмет Байтұрсынұлы», г. Костанай, Республика Казахстан.

Паритова А.Е. – PhD, и.о. ассоциированного профессора ветеринарной санитарии, НАО «Казахский агротехнический исследовательский университет имени С.Сейфуллина», г. Астана, Республика Казахстан.

В данной исследовательской работе рассматривается проблема опухолей молочной железы у кошек, которая является одной из наиболее часто встречающихся онкологических патологий домашних животных в городе Астана.

За последние годы информированность владельцев о том, что такое рак молочной железы стремительно растёт. Внимательность к своему питомцу позволяет выявить злокачественный процесс на раннем этапе и помогает спасти жизнь.

В этой связи наши исследования были направлены на изучение клинико-морфологических проявлений опухолей молочной железы у кошек в ОО «Зоосфера», проведен анализ распространения их у кошек, а также анализ гематологических, ультрадиагностических, рентгенологических и гистологических методов исследования.

Цель исследования – изучить основные клинико-морфологические проявления опухолей молочной железы у кошек в ОО «Зоосфера» с учетом патоморфологических изменений. Для достижения поставленной цели проведен анализ распространенности опухолей молочной железы среди кошек в Астане, а также оценены различные методы диагностики, включая гематологические, ультразвуковые, рентгенологические и гистологические исследования. В рамках работы проанализированы данные амбулаторных журналов клиники за период с 2022 по 2024 год, а также обследованы 15 кошек, имеющих сим-птомы заболевания. Методами исследования стали клиническое обследование, ультразвуковая и рентгенологическая диагностика, биохимическое исследование крови, а также патологоанатомическое и гистологическое исследование тканей.

Результаты исследования позволят улучшить диагностику и лечение опухолей молочной железы у кошек, а также повысить шансы на выживание питомцев при раннем выявлении заболевания.

Ключевые слова: *опухоль, молочная железа, кошки, диагностика, патоморфологические изменения, гиперплазия, мастопатия.*

Introduction. Mammary tumors are the most common oncological pathology in domestic animals [1, p.76, 2, p.66]. The reason of tumor growth is the unlimited and uncontrolled proliferation of cells by the body, which in turn leads to dysfunction and tissue destruction, and ultimately to the death [3, p.34].

This pathology is widespread in Astana, especially among age groups of cats (up to 3 years, from 3 to 6 years, from 6 to 9 years, from 9 to 12 years, from 12 years), is endemic in nature and causes significant economic damage.According to veterinary clinics in Astana, mammary tumors in cats are the most common neoplasms causing death, and occupy third place among the most frequently diagnosed neoplasms after lymph hematopoietic tumors and skin tumors.

The disease mainly affects cats over 10 years of age, but cases also occur among younger cats [4, p.30].

Although this disease has a long history of treatment, the causes of tumors are still not fully comprehended [5, p.79].

Sterilization of cats does not slow down the growth of neoplasia and does not prevent the occurrence of secondary formations. While sterilization of cats at an early age before the appearance of the first heat significantly reduces the risk of subsequent development of mammary tumors [6, p. 79].

Tumors in cats appear without any additional clinical signs at the initial stage and develop very quickly. At later stages, this leads to the development of metastases in other organs [7, p.9].

The overwhelming majority of cases of mammary tumors are mammary gland cancer, but benign forms of tumors in cats are quite rare. Effective diagnosis and correctly selected method of treating animal mammary tumors are an important task in veterinary medicine [8, p. 31].

It is very important to be able to diagnose this problem at an early stage. Since timely seeking veterinary help will increase the chances of survival of a pet [9, p. 265, 10, p. 393].

When studying the literature dedicated to diagnosis and treatment of mammary tumors, there is insufficient coverage of the issue of early clinical diagnosis and statistical data on the incidence and treatment of cats in the Republic of Kazakhstan and in the CIS countries.

Research purpose: study the main clinical and morphological manifestations of mammary gland tumors in cats at the Zoosfera NGO, taking into account pathomorphological changes.

To achieve this purpose, we identified the following objectives:

1. Conduct an analysis of the incidence of mammary tumors in cats in Astana at the Zoosfera NGO;
2. Analyze hematological, ultradiagnostic, radiological and histological research methods.

Materials and research methods:

The research was carried out at the clinic of the Zoosfera NGO from 04/03/2023 to 12/25/2024. Statistics on the number of cats with mammary tumors were selected and analyzed for the period from 01/01/2022 to 25/12/2024.

To conduct monitoring studies to study the prevalence rate of mammary tumors among cats in Astana, admitted to the veterinary clinic of the Zoosfera NGO, outpatient logs of the veterinary clinic were studied.

The objects of the study werecats of different sexes aged from 10 to 12 years, owned by individuals and having symptomatic signs of a mammary tumor. The total number was 15 animals.

To get diagnosed, the owners of all animals carefully collected anamnesis, examined and palpated the mammary glands, and conducted a thorough clinical examination of all organs and systems. We paid attention to the number of affected mammary glands, their asymmetry, and increase in size, pain, and enlargement of the saphenous veins.

The study used clinical, biochemical, ultrasound, X-ray, histological and pathological research methods.

X-ray and ultrasound examination.

X-rays were performed using a PZ Medical 1417 on a detector panel.

Ultrasound diagnostics were carried out using a SonoScapeS40EXP device. Two types of sensors are used for diagnostics: linear and convex using electrode highly conductive gel “Akugel – Electro”. To study biochemical and general blood tests, an express method was performed using a Mindray BC-5000 Vet hematology analyzer and a Mindray BS-2240 Vet automatic biochemical analyzer.

Histological research methods were carried out at the Cytovetanalytical office of petpathomorphology (analytical office of petpathomorphology), staining method: Pappenheim, Papanicolaou, hematoxylin-eosin.

Research results. As a result of monitoring studies conducted to study the prevalence rate of mammary tumors among cats in Astana, admitted to the veterinary clinic of the Zoosfera NGO during the period from 01/01/2022 to 12/25/2024, 115 cases were registered. Out of these, 15 cases were selected for the study period.
The summarized results of the monitoring studies are presented in Table 1.

Table 1 – Prevalence of mammary tumors in cats

№	Symptoms	Number of animals
1	Gender	
	Cat	Cat
2	Agegroup	
	Up to 3 years	6
	From 3 to 6 years	15
	From 6 to 9 years	24
	From 9 to 12 years	33
	From 12 years	37
3	Animalstatus	
	Sterilized	Sterilized
	Unsterilized	Unsterilized
4	Animalbreed	
	Metis	46
	Domestic	51
	Britishfold	5
	Bengal	2
	Siamese	3
	Persian	4
	Exotic breeds	4
	Total: 115	

As a result of comprehensive studies, it was found that the prevalence rate of mammary tumors is overwhelmingly characteristic of female cats, and it should be noted that unsterilized female cats are more susceptible to the disease. There is no dependence on the breed, but there is a dependence on the age category of the animal.

As can be seen from Table 1, the prevalence rate of mammary tumors in cats in the veterinary clinic of the Zoosfera NGO depended to a greater extent on such characteristics as the type, age of the animal, as well as sterilization. There was no significant difference between the breeds of the sick animals. Since the two most numerously represented breeds, such as mestizo and domestic, are the most common among the animals that visited during the studied period. Consequently, the number of cases is directly proportional to the total number of calls.

It should be noted that mammary tumors were detected more often among unsterilized cats – 53 cases, which amounted to 49.5% of the total number of registered cats.There was no particular dependence on the breed, since a large number of cases of mammary tumors among breeds such as mixed breed and domestic were associated with the popularity of these breeds among domestic cats in Astana.According to the history of calls to the veterinary clinic over the past year, these breeds have been represented in the overwhelming majority. If we consider the age factor, we can see a gradual increase in the number of cases of registered mammary tumors with increasing age of animals. Thus, 77.8% were animals over 6 years old.

Figure 1 shows the age dependence in the prevalence of BF-(breast tumor).

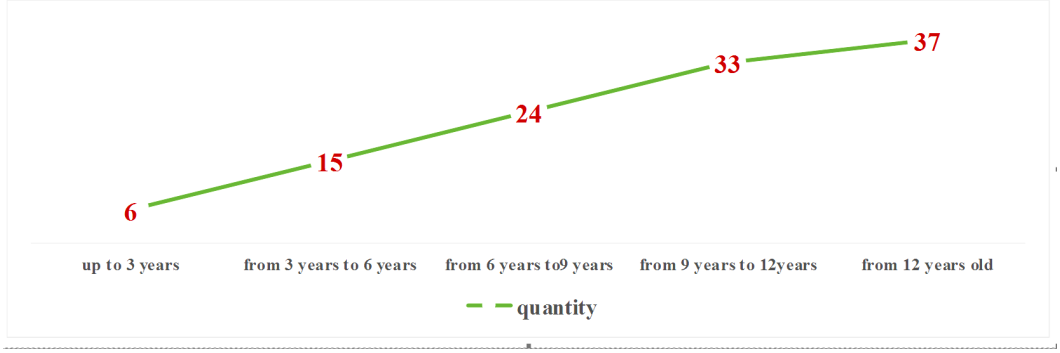

Figure 1 – shows the age dependence in the prevalence of BF

As can be seen from the diagram in Figure 4, with increasing age, the number of cases also increases. In the age group up to 3 years – 6 animals, from 3 to 6 years – 15, from 6 to 9 years – 24, from 9 to 12 years – 33 and in the age group from 12 years – 37animals.

Thus, BF in the clinic is quite common in aged females over 6 years old. Mixed-breed and domestic breed cats are susceptible to the spread of AMF throughout Astana. At the same time, in unsterilized cats, manifestations of AMF were recorded more often.

As an additional study, in the presence of mammary gland tumors, animals are sent for a general and biochemical blood test.

A general blood test (GBT) allows us to provide information about the ratio of blood cells, hemoglobin content, and hematocrit.

Table 4 presents the average values of general blood parameters of the studied animals with BF.

Table 2 – Generalbloodtest

№	Parameter	Norm	Results (n=15)
1	Hemoglobin	110-145 g/l	141±9,54 g/l
2	Redbloodcells	3,50-4,70×10^{12}/l	9,25±1,12×10^{12}/l
3	Colorindicator	0,86-1,5	0,46±0,04
4	Hematocrit	32,5-41,5%	57,4±2,46%
5	Average red blood cell volume	76,0-91,0fl	62,1±3,21 fl
6	Average Hb content in erythrocyte	25,5-33,0pg	15,2±2,65 pg
7	Average Hb concentration in erythrocyte	317-354 g/l	246±9,23 g/l
8	Average Hb concentration in erythrocyte	11,5-14,5 %	20,4 ±2,56 %
9	Platelets	160-380×10^{9}/l	287±8,29×10^{9}/l
10	Lymphocytes	24,0-54,0 %	55,3±5,73 %
11	ESR	2-15 mm/hour	39,4±8,43 mm/hour

As can be seen from Table 2 and as per general blood test results, animals with mammary gland tumors have significant excesses of the norm for many indicators.

Decreases are observed in such indicators as the color index of blood, the average volume of erythrocytes and the average concentration of hemoglobin (Hb) in an erythrocyte. Thus, the color blood index was 0.46 ± 0.04, while the norm was 0.86 – 1.5. The average erythrocyte volume was 62.1±3.21 fl, with the norm being 76.0 – 91.0. The average concentration of Hb in an erythrocyte is 246±9.23 g/l, with the norm being 317–354.

These changes in the blood are indicators of anemia, which is a characteristic sign of a tumor process in the body. Only values such as hemoglobin and platelet count remain within normal limits. Table 3 presents the average values of the leukogram indicators of the studied animals with AMF.

Table 3 – Leukogram data of the studied animals with BF

№	Parameter	Norm	Results (n=15)
1	Leukocytes	4,5-10,0×10^{9}/l	18,84±1,43×10^{9}/l
2	Neutrophils	40,0-65,0%	31,4±0,67 %
3	Neutrophils (abs. count)	2,0-5,50×10^{9}/l	5,91±0,52×10^{9}/l
4	Eosinophils	0,0-7,0 %	1,38±0,88 %
5	Eosinophils (abs. count)	0,02-0,30*10^{9}/l	0,0*10^{9}/l
6	Basophils	0,0-1,0%	0,47±0,05 %
7	Basophils (abs. count)	0,0-0,065×10^{9}/l	0,020±0,03×10^{9}/l
8	Monocytes	2,0-10,0%	13,2±1,24 %
9	Monocytes (abs. count)	0,09-0,60×10^{9}/l	2,49±0,56×10^{9}/l
10	Lymphocytes	24,0-54,0%	55,3±5,73 %
11	Lymphocytes (abs. count)	1,20-3,00×10^{9}/l	10,42±2,73×10^{9}/l

As can be seen from Table 3, when analyzing the blood of animals with mammary gland tumors, there are significant excesses of the leukogram indicators. Thus, the number of leukocytes was 18.84±1.43×109/l with the norm being 4.5 – 10.0. The number of monocytes was 13.2±1.24% with the norm being 2.0 – 10.0.

Decreases are observed in such indicators as neutrophils and eozonophils. The number of neutrophils and eozonophils was 31.4±0.67% and 0.0×109/l with the norm being 40.0 – 65.0 and 0.02 – 0.30, respectively.

This increasing leukocytosis indicates the presence of a tumor process in the animal's body. Only values such as the number of eosinophils remain within normal limits.

There is a shift to the right of the parameters in the leukogram.

As a result, the decrease in blood parameters in mammary gland tumors indicates not only anemia but also that the reduction in hemoglobin is a consequence of leukemia. The decrease in hemoglobin levels in the body is a response of the immune system to the malignant progression of the tumor.

Cancer cells can suppress the body's immune capacity and hemoglobin, which leads to the development of anemia. Anemia, in turn, worsens the animal's condition, while the immune system becomes less effective in fighting cancer cells.

Biochemical blood analysis (BCA) is a laboratory diagnostic method that provides information about metabolism, the functioning of internal organs, and whether the body requires any micronutrients.

Table 4 presents the average values of biochemical blood parameters of the studied animals with AMF.

Table 4 – Biochemicalbloodtest

№	Parameter	Norm	Results (n=15)	Comments
1	Urea	2,50-6,00	10,12±1,67 mmol/l	Increased
2	Creatinine	44,00-88,00	101,34±1,12 μmol/l	Increased
3	Glucose	3,33-5,55	3,74±0,79 mmol/l	Normal
4	ALT	0,00-39,00	83,2±5,12 U/l	Increased
5	AST	0,00-51,00	57,1±4,76 U/l	Increased
6	Bilirubin (total)	<17,00	7,42±3,81 μmol/l	Normal
7	Alkalinephosphatase	189±15,47	189±15,47 U/l	Normal

As can be seen from Table 4, in a biochemical analysis of the blood of animals with mammary tumors, increases in indicators such as urea, creatinine, ALT and AST are observed. Thus, urea in the blood was 10.12±1.67 mmol/l with a norm of 2.50-6.00. Creatinine was 101.34±1.12 μmol/l with a normal range of 44.00-88.00.

The average values of ALT and AST were 83.2±5.12 U/l and 57.1±4.76 U/l, with the norm being 39.0 and 51.0, respectively. No deviations from the norm were observed for such indicators as glucose, total bilirubin and alkaline phosphatase.

An increase in ALT and AST levels indicates liver inflammation, suggesting impaired liver function. Elevated creatinine and urea levels point to kidney dysfunction and the presence of diseases. However, it is important to note that changes in ALT, AST, creatinine, and urea levels do not always indicate neoplasms, as they may be associated with age-related changes in cats.

Ultrasound examination described typical changes observed in the internal organs of animals. According to the results of ultrasound, in some cats no changes were detected in the internal organs, however, in 2 cats metastases were noticed in the lung area, but changes were noticed in the liver and gall bladder.

Ultrasound diagnostics in many cats showed that the liver is located at the edge of the xiphoid process of the costal arch. The structure is fine-grained, homogeneous, enlarged with a rounded edge. In this case, the echogenicity of the parenchyma is increased and the vascular pattern is not visible due to compaction of the organ. The walls of the gallbladder are thickened; the contour is clear and dense.

When examining the spleen, it was revealed that it was not enlarged in size; its structure was fine-grained, and homogeneous. The echogenicity of the parenchyma is normal. Pathological formations are not determined.

The pancreas in cats ranged in size from 6 mm to 8 mm, it was homogeneous in structure. Diffuse changes are observed. No pathological formations are observed. The stomach is not full, the contents are gases. The thickness of the stomach wall in cats varied from 4.8 mm to 5 mm. The differentiation of layers is clear, and wall formations are not defined.The intestines of cats are in normal condition. Peristalsis and aeration are normal. The thickness and layering of the walls are also normal. Mesenteric lymph nodes are normal.

When examining the right and left kidneys, the edges and their contour were smooth, reaching a size of 37×24 mm to 37×25 mm, the edges were smooth. The echogenicity of the parenchyma is normal. The pyramids and renal sinus are not changed. The pelvis is dilated and compacted, the presence of inclusions is observed. Cortico-cerebral differentiation is visualized well.

The bladder was presented with a volume of 18 ml to 20 ml, not full, symmetrical. The walls are 17 – 18 mm thick, smooth. Pathological formations are not located. The contents are anechoic. The uterus is not located. There is no free fluid.

The cardiac aorta is from 5 mm to 7 mm, the aortic valve is not changed. The left ventricle of the heart is 8 – 9 ml, the ejection fraction is 88 – 90%, the heart rate is 157 -160 beats/min. The left atrium is from 8 mm to 9 mm, the atrial appendage without pathologies. Right atrium up to 9 mm. Right ventricle up to 10 mm. The lungs are homogeneous in structure; the vascular pattern is not changed.

Thus, these studies showed that, in general, many cats showed no changes in neoplasms in the internal organs. Only slight changes in the pancreas and liver indicate age-related changes in cats.

However, during an ultrasound examination of the chest cavity in 2 cats, it was revealed that the lungs had a heterogeneous structure, there was effusion into the pleural cavity, the vascular pattern was not changed, and the echogenicity of the liver was increased. At the same time, the cats had shortness of breath, weight loss, and a general depressed state. Ultrasound revealed metastases in the chest cavity in the lung area.

Figure 2 shows that the lungs are white, fluid accumulates in the pleural cavity, which indicates that a strong inflammatory process is underway.

Figure 2 – Metastases in the lung

Figure 3 shows the size of the tumor on ultrasound image. The tumor is 0.46 cm wide and 1.03 cm long.

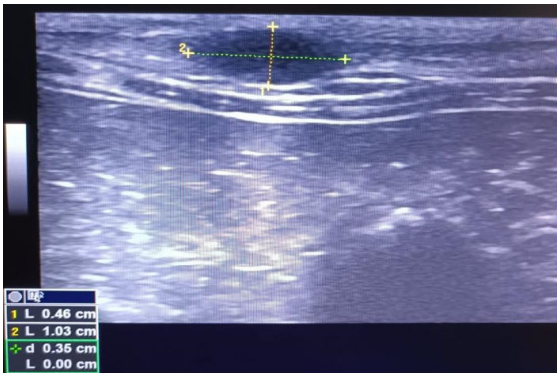

Figure 3 – Tumor size determination

In addition to ultrasound, the cats underwent X-ray examinations; as a result, no manifestations of metastases were noticed in them. Based on the ultrasound findings, two suspected cats also underwent X-ray examination. The X-ray image is shown in Figure 4. Here, a formation shaped as a large lump in the abdominal cavity and changes in the lung area, which were shown by ultrasound data, are clearly visible.

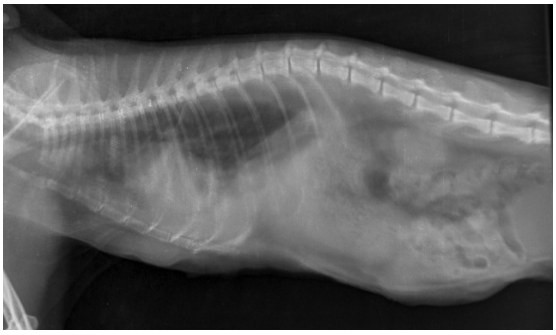

Figure 4 – X-ray of a breast tumor

Thus, based on ultrasound and x-ray imaging, it was concluded that there were metastases in the lung. Diagnosis: breast neoplasm.

During the operation to remove a breast tumor (mastectomy), surgical material was collected to be sent for histological and microscopic studies to classify this tumor. When collecting anamnesis, it was noted that the disease lasted for 2 – 3 years. The size of the removed tumor was 4x4 cm. The sealing was dense with pronounced vascularization.For microscopic examination, surgical material was taken – a fragment of tissue, whitish in color with dense layers, with small nodular formations of a whitish color.

In one of the studied preparations stained with hematoxylin and eosin, it was found that there was material with pronounced autolytic changes. The lobules of the mammary gland are represented by tubular structures in normal numbers, lined with single-layer columnar epithelium with monomorphic nuclei without signs of atypia and proliferative activity. The ducts are sharply expanded; multiple ductal slit-like structures (10-75%) and large solid areas are identified in their lumen.Glandular structures with a double contouring lining, the basal layer is represented by small cuboidal cells, the luminal layer is polygonal, the epithelium with areas of polarity disturbance, with scanty weakly eosinophilic homogeneous cytoplasm, round nuclei with finely dispersed chromatin and single basophilic nucleoli. The degree of nuclear atypia is high. Finely focal tumor necrosis with foci of calcification is detected. Mitotic activity is 9 mitoses per 2.37 mm^2 (10 fields of view at 400 magnifications). Lymph-vascular invasion, invasion of the mammary gland stroma, and lymph nodes are not included in the submitted material.Pathological and histological conclusion (diagnosis): the

histological picture is most consistent with the diagnosis of moderately differentiated ductal carcinoma of the breast, 6 points (Elston and Ellismitotic modified).

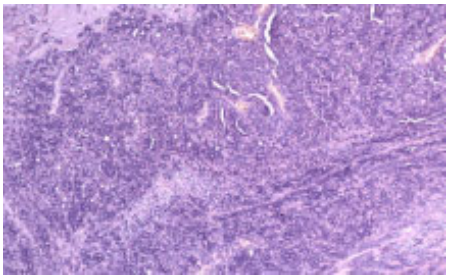

Figure 5 – Moderately differentiated ductal carcinoma of the breast

Figure 5 shows a histological specimen of a breast tumor, in which the type of tumor was identified, that is, moderately differentiated carcinoma (G2) of the breast.

Discussion

The results of our study confirmed that mammary tumors in cats are one of the most common oncological pathologies among domestic animals, especially in older age groups.Our data, collected at the Zoosfera veterinary clinic, demonstrates a high incidence among females, with unsterilized cats being more likely to develop mammary tumors. This is consistent with other studies showing that spaying before the first heat significantly reduces the risk of mammary tumors [11, p.210].

Age dependence is a key factor in the spread of breast tumors. According to our study, 77.8% of cases were reported in cats older than 6 years, which confirms the world literature that aging is an important risk factor for the development of mammary gland tumors in cats [12, p. 215].However, cases of the disease in younger cats (under 6 years of age) have also been documented, suggesting that mammary tumors may occur even in younger animals.

Our studies showed that in the vast majority of cases among sick cats, mammary tumors were malignant. This is also consistent with information presented in the literature, where mammary gland cancer in cats is significantly more common than benign tumors [13,p.240].This emphasizes the need for timely diagnosis and treatment of this disease, since early diagnosis significantly increases the chances of successful treatment and survival of the animal [14, p. 392].

A particularly important aspect is the use of complex diagnostic methods. The use of ultrasound, radiography, general and biochemical blood tests, as well as histological examination significantly improves the accuracy of diagnosis. Our study showed significant increases in a number of blood parameters, such as white blood cells, monocytes, as well as changes in biochemistry, including increased levels of urea and creatinine, which indicates the presence of an inflammatory process and impaired functioning of the kidneys and liver. These changes confirm the presence of general inflammation in the body, which can be caused by a tumor process.

Also, a significant role is given to pathological examination, which allows one to more accurately determine the stage of the disease and carry out differential diagnosis between benign and malignant tumors.

Ultrasound examinations performed during the study also demonstrated some typical signs of tumor processes, such as changes in the liver, metastases in the lungs in two cats, which further confirm the importance of early diagnosis and regular monitoring of the condition of animals, especially in old and unsterilized cats.

Thus, the results of our study highlight the importance of timely diagnosis and an integrated approach in the treatment of mammary tumors in cats. Attention should be paid not only to the treatment of tumors, but also to preventive measures, such as sterilization of cats before the first heat, which significantly reduces the risk of disease.

Conclusions

1. As a result of monitoring studies, it was found that the prevalence of mammary tumors is overwhelmingly characteristic of females, and it should be noted that unsterilized females are more susceptible to the disease. There is no dependence on the breed, but there is a dependence on the age category of the animal.It was found that during the period from January 1, 2022 to December 14, 2024, 115 cases of animals with AMF were registered, which indicates the high prevalence of this pathology among cats in Astana.

2. As a result of a hematological analysis of the blood of animals with mammary gland tumors, significant deviations from normal values were identified, which indicates the development of a tumor process. One of the most noticeable changes is leukocytosis, which is often observed when there is a tumor in the body.

In addition, decreased values were recorded for a number of other blood parameters characteristic of anemia:

The color blood index was 0.46±0.04, with the norm being 0.86-1.5, which indicates a decrease in the level of hemoglobin in red blood cells. The average erythrocyte volume was 62.1±3.21 fL, with the norm being 76.0-91.0 fL, which indicates microcytosis – a decrease in the size of erythrocytes.The average hemoglobin concentration in the erythrocyte was reduced to 246±9.23 g/l, while the norm was 317-354 g/l, which also confirms anemia. The number of neutrophils was 31.4±0.67%, which is below the norm (40.0-65.0%), and the number of eosinophils was 0.0*10^9/l, while the norm is 0.02-0.30*10^9/l. A decrease in these blood parameters indicates the development of anemia, which is typical for animals with neoplasms. These changes may be associated with impaired hematopoietic function and general exhaustion of the body in response to the progression of the tumor process.

As a result of ultrasound and x-ray studies, metastasis was established in the internal organs, which is not uncommon in breast tumors.

REFERENCES:

1 **Muranova O.Yu. Faktory' riska raka molochnoj zhelezy'** [Risk factors for breast cancer]**.** *Sibirskij onkologicheskij zhurnal. Prilozhenie,* 2007, no. 2, pp. 76-77. (In Russian)

2 **Olhovskij V.K. Lechenie onkologicheskih zabolevanij** [Treatment of oncological diseases] Rostov-na-donu «*Novejshij spravochnik»,* 2007. pp. 66-67. (In Russian)

3 **Volkova S.V. Kompleksny'e metody' lechenija opuholej molochnoj zhelezy' u koshek** [Complex methods of treatment of mammary gland tumors in cats]. *Agrarny'j vestnik Urala,* 2008, no. 11 (53), pp. 34-35. (In Russian)

4 **Golovin T.S. Kliniko-morfologicheskie formy' neoplazij molochnoj zhelezy' u koshek v g. Kurske** [Clinical and morphological forms of neoplasia of the mammary gland in cats in Kursk]. *Vestnik Kurskoj gosudarstvennoj sel'skohozyajstvennoj akademii*, 2017, no. 7, pp. 29-32. (In Russian)

5 **Yakunina M.N. Rak molochnoj zhelezy' u koshek i sobak** [Breast cancer in cats and dogs]. Moscow, Zoomedlit*,* 2011, pp. 78-82. (In Russian)

6 **Yakunina M.N. Chto nuzhno znat' o rake** [What you need to know about cancer]. *Obshhie svedeniya dlya veterinarnogo vracha shirokogo profilya, Vetpharma,* 2012, no.6, pp. 7-11. (In Russian)

7 **Fomicheva D.V., Timofeev S. V., Treshhalina E.M. Osobennosti metastazirovaniya raka molochnoj zhelezy' u koshek** [Features of metastasis of mammary cancer in cats]. *RVZh*, 2007, no.2, pp. 30-33 (In Russian).

8 **Cable CS, Peery K, Fubini SL. Radical mastectomy in 20 ruminants.** *Vet Surg.*, 2004, 33(3):263-6.

9 **Morris J. Mammary tumours in the cat Size matter, so early intervention saves lives**. *J. Feline Med. and Surgery*, 2013, vol.15 (5), pp. 391-400.

10 **Beaver BV, Reed W, Leary S, et al**) **Report of the AVMA Panel on euthanasia.** *Journal of the American Veterinary Medical Association,* 2000, 218, pp. 669-696.

11 **Seixas F., Pires M.A., Lopes C.A Complex carcinomas of the mammary gland in cats: Pathological and immunohistochemical features**.*The Veterinary Journal Volume,* 2008, 176, iss. 2, pp 210-215.

12 **Giménez F, Hecht S, Craig LE, Legendre AM. Early detection, aggressive therapy: optimizing the management of feline mammary masses.** *J Feline Med Surg.*, 2010, 12(3):214-24. DOI: 10.1016/j.jfms.2010.01.004.

13 **S.W. Mills, K.M. Musil, J.L. Davies, S. Hendrick, C. Duncan, M.L. Jackson, B. Kidney, H. Philibert B. K. Wobeser, and E. Simko Veterinary Pathology.** *American College of Veterinary Pathologists*, 2014, vol. 52, iss. 2, pp. 238-249. https://doi.org/10.1177/0300985814543198.

14 **Morris J. Mammary tumours in the cat: size matters, so early intervention saves lives.** *J Feline Med Surg.,* 2013, 15(5):391-400. DOI: 10.1177/1098612X13483237. PMID: 23603502; PMCID: PMC10816587.

Information about the authors:

Murzakayeva Gulmira Kalihanovna – PhD, Senior Lecturer of the Department of veterinary sanitation, S.Seifullin Kazakh Agro Technical Research University NLC, Republic of Kazakhstan, 010011, Astana, 62 Zhenis Ave., tel.: 8-7172-29-72-52, e-mail: m.gumika@list.ru.

Yergazina Assel Mikhailovna – PhD, acting Associate Professor of the Department of veterinary medicine, Akhmet Baitursynuly Kostanay Regional University NLC, Republic of Kazakhstan, 110000, Kostanay, 47 Baitursynov Str., tel.: +7-777-376-00-76, e-mail: ergazina.asel@mail.ru.*

Aubakirov Marat Zhaksylykovich – PhD, Head of the Department of veterinary medicine, Akhmet Baitursynuly Kostanay Regional University NLC, Republic of Kazakhstan, 110000, Kostanay, 47 Baitursynov Str., tel.: +7-707-550-44-38, e-mail: aubakirov_m66@mail.ru.

Paritova Assel Yerzhanovna – PhD, acting Associate Professor of the Department of veterinary sanitation, S.Seifullin Kazakh Agro Technical Research University NLC, Republic of Kazakhstan, 010011, Astana, 62 Zhenis Ave., tel.: 8-7172-29-72-52, e-mail: paritova87@mail.ru.

Мурзакаева Гульмира Калихановна – PhD, ветеринариялық санитария кафедрасының аға оқытушысы, «С.Сейфуллин атындағы Қазақ агротехникалық зерттеу университеті» КЕАҚ, Астана қ., Қазақстан Республикасы, 010011, Астана қ, Жеңіс даңғылы, 62, тел:. 8-7172-29-72-52, e-mail: m.gumika@list.ru.

Ергазина Асель Михайловна – PhD докторы, ветеринариялық медицина кафедрасы қауымдастырылған профессорының м.а., «Ахмет Байтұрсынұлы атындағы Қостанай өңірлік университеті» КЕАҚ, Қазақстан Республикасы, 110000, Қостанай қ., Байтұрсынов көш, 47., тел.: +7-777-376-00-76, e-mail: ergazina.asel@mail.ru.*

Аубакиров Марат Жаксылыкович – PhD, ветеринариялық медицина кафедрасының меңгерушісі, «Ахмет Байтұрсынұлы атындағы Қостанай өңірлік университеті» КЕАҚ, Қазақстан Республикасы, 110000, Қостанай қ., Байтұрсынов көш, 47., тел.: +7-707-550-44-38, e-mail: aubakirov_m66@mail.ru.

Паритова Әсел Ержанқызы – PhD, ветеринариялық санитария кафедрасының қауымдастырылған профессоры м.а., «С.Сейфуллин атындағы Қазақ агротехникалық зерттеу университеті» КЕАҚ, Астана қ., Қазақстан Республикасы, «С.Сейфуллин атындағы Қазақ агротехникалық зерттеу университеті» КЕАҚ, Астана қ., Қазақстан Республикасы, 010011, Астана қ, Жеңіс даңғылы, 62, тел:. 8-7172-29-72-52, e-mail: paritova87@mail.ru.

Мурзакаева Гульмира Калихановна – PhD, старший преподаватель кафедры ветеринарной санитарии, НАО «Казахский агротехнический исследовательский университет имени С.Сейфуллина», Республика Казахстан, 010011, г. Астана, проспект Женис, 62, тел:. 8-7172-29-72-52, e-mail: m.gumika@list.ru.

Ергазина Асель Михайловна – PhD, и.о. ассоциированного профессора кафедры ветеринарной медицины, НАО «Костанайский региональный университет имени Ахмет Байтұрсынұлы», Республика Казахстан, 110000, г. Костанай, ул. Байтурсынова 47, тел.: +7-777-376-00-76, e-mail: ergazina.asel@mail.ru.*

Аубакиров Марат Жаксылыкович – PhD, заведующий кафедрой ветеринарной медицины, НАО «Костанайский региональный университет имени Ахмет Байтұрсынұлы», Республика Казахстан, 110000, г. Костанай, ул. Байтурсынова 47, тел.: +7-707-550-44-38, e-mail: aubakirov_m66@mail.ru.

Паритова Асел Ержановна – PhD, и.о. ассоциированного профессора ветеринарной санитарии, НАО «Казахский агротехнический исследовательский университет имени С.Сейфуллина», Республика Казахстан, 010011, г. Астана, проспект Женис, 62, тел:. 8-7172-29-72-52, e-mail: paritova87@mail.ru.