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The study of frequency, diagnosis and treatment of mammary tumors in dogs

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Abstract:

Tumors of mammary glands in dogs have become more frequent in our days and they need not only a special attention but also deep knowledge, to treat them in correct way. This study was based on 42 clinical cases of mammary tumors that have been presented in the clinic of Veterinary Medicine Faculty and in some the clinics of Tirana district. This study was performed during the period 2011-2016. The affected dogs were clinically examined through general and special examination test. All the records were saved and analyzed. Many of the animals diagnosed with mammary tumor were treated in surgical way. This treatment was based according to the type of the tumor and the rate of its spread in the affected animal organism. The surgical treatment resulted as the most successful treatment of many types of the mammary gland tumors except the inflammatory carcinoma. The surgical removal of these masses was also used to make the histological examination.

The surgical treatment resulted successful in 30 dogs affected from the mammary gland tumors, 13 of them have only one papilla affected from the tumor. The surgical treatment resulted no successful in 12 dogs witch were affected from maligned tumors. 5 of them resulted refractory from the treatment. 4 of them resulted with metastases mainly in pulmonary part.

Key words: Dog, tumor, mammary, sterilization, benign, malinger.

INTRODUCTION

The cause of neoplasia of the mammary gland is still unknown, however many of them are hormone dependent and many of them can be prevented if ovariohisterectomy is performed before the animals became one year old. The risk of mammary gland tumors in the dogs that are sterilized before their first estrus is 0.05%. The risk increases with 8% after one estral cycle and 26% after second estrus cycle.

The estrogenic receptors and /or progesterone receptors are found in 80% of the mammary glands in dogs. The dogs with tumors that have estrogenic receptors or progesterone receptors live longer than in cases when these receptors absent. The progesterone receptors are found in some mammary glands. The use of progesterone can lead to the development of the benign tumor of the mammary glands. About 50% of mammary tumors in dogs are benign and most of them are fibrosarcoma. Carcinoma comprises most of the maligned tumors. The mammary tumors develop as small multiple nodules inside the mammary gland. The tumors can develop in one of the five couples of glands. Also at the same time can be develop the two forms of tumors benign and malign in the same mammary glands. Approximately 2/3 of the mammary glands develop in the fourth or fifth couple of the mammary glands perhaps as a consequence of the voluminous tissue of these glands. Both malign and benign tumors can look like small strong nods with well-defined margins making so the deferential diagnose more difficult only through physical examination. The aggressive growth, the invasion at the level of the adjacent tissues and the ulceration are the common signs of the malignant tumors.

The malignant tumors spread through the lymphatic ways and the blood vessels into the regional lymphatic nods and to the lungs.

The diagnostic evaluation of a dog with mammary tumor consists on physical examination blood test, and biochemical test. Thoracic X-Ray should also be evaluated for metastasis at lungs level before the surgical intervention. The abdominal X-Ray are also very helpful to discover if the sublumbar lymphatic nods are affected or not, which usually happens when the tumors are localized at the level of caudal mammary glands. While the aspiration technique for the cytological evaluation is not recommended because it can not make the proper difference between the types of the tumors.

The mammary glands tumors treatment starts after the correct diagnose of the clinical phase of the tumor. The localized tumor and the tumors that exhibit local regional invasion are the easiest treatable tumor in local way. The extensive regional disease and metastasis tumors can be treated much better through systemic therapy. If the clinical phase confirms that a tumor is isolated in one body region and the surgical intervene is possible then the operator removal of the tumor mass is the best way of treatment. Radiotherapy is another form of localized treatment and it could be very effective for the treatment of some tumor types. The systemic therapy (chemotherapy and immunotherapy) is the best way for the treatment of the systemic disease of tumors. The traditional therapy of the tumors (surgery, radiation, chemotherapy) has been successful in the treatment of some malign tumors type in humans and in animals. Although the local aggressive therapy has been successful through keeping in control some of the primary tumors the treatment can fail because of the metastasis development.

MATERIAL AND METHODS

This study was based on 42 clinical cases of mammary tumors that have been presented in the clinic of Veterinary Medicine Faculty and in some the clinics of Tirana district. This study was performed during the period 2011-2016. The affected dogs were examined through general and special examination. All the records were saved and analyzed. Many of the animals diagnosed with mammary tumor were treated in surgical way. This treatment was based according to the type of the tumor and the rate of its spread in the affected animal organism. During this study the attention was focused on:

- The frequency of different types of gland mammary tumors in correlation with each-other.
- Clinical examination and diagnosis.
- Surgical treatment through, mastectomies.
- Prevention of gland mammary tumors.

During the period 2011-2016 were studied the epidemiology's records of gland mammary tumors in dogs. These records were statically worked out and computerized. All these records were recorded in one register. The records include information about clinical signs, general clinical examination, special clinical examination and surgical technique applied.

In this study were compared clinical characteristic of different types of gland mammary tumors. The diagnosed cases of gland mammary tumors were classified according to diagnosis and surgical technique accompanied with chemotherapy or not.

The epidemiology of gland mammary tumors in dogs was studied according to:

- Age group
- Breed
- Ovariohisterectomy

After the clinical examination and laboratory test, the gland mammary tumors were classified according to their localization and their size.

RESULTS AND DISCUSSION

The frequency of different types of histological diagnosed gland mammary tumors is presented on table No.1

Table No.1

The type of diagnosed tumor	No. Cases	The frequency(%)
Fibrosarcoma	4	25%
Simple adenoma	2	12.6%
Benign mesencimal tumor	1	6.2%
Solid carcinoma	3	18.7%
Tubular adenocarcinoma	2	12.6%
Papillary adenocarcinoma	1	6.2%
Carcinoma anaplastic	1	6.2%
Sarcoma	1	6.2%
Karcinosarcoma	1	6.2%
All	**16**	**99.9%**

Table No. 1 The frequency of mammary tumors histological diagnosed.

After the detection of the mammary tumors presence in 42 dogs, was also performed the measurement of the tumor size because this factor is a very important prognostic indicator for mammary tumors. The frequency of the different types of mammary glands according to their size is presented on the tsble No.2

Table No. 2

The type of diagnosed tumor	No. of case	Frequency (%)
Mammary tumor < 3cm	8	19%
Mammary tumor 3-5 cm	21	50%
Mammary tumor >5 cm	13	31%
All	**42**	**100%**

The frequency of different tumor types in mammary glands

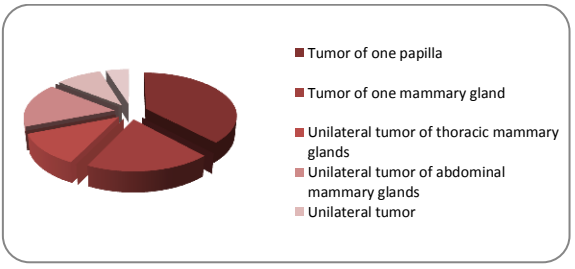
Based on the location site of the mammary tumor in correlation with mammary papilla, mammary gland and mammary gland location, the tumors were classified as:

- *Tumor of one papilla*
- *Tumor of one mammary gland*
- *Unilateral tumor of thoracic mammary glands*
- *Unilateral tumor of abdominal mammary glands*
- *Unilateral tumor of mammary gland*
- *Bilateral tumor of mammary gland*

Table No. 3

Mammary tumor location	**No. cases**	**%**
Tumor of one papilla	**16**	**38.1%**
Tumor of one mammary gland	**8**	**19.1%**
Unilateral tumor of thoracic mammary glands	**5**	**11.9%**
Unilateral tumor of abdominal mammary glands	**7**	**16.6%**
Unilateral tumor of mammary gland	**4**	**9.5%**
Bilateral tumor of mammary gland	**2**	**4.7%**
all	**42**	**99.9%**

Table No. 3 The percentage of mammary tumors according to their location.



Graphic No. 1 The percentage of mammary tumors according to their location

As it is shown on the table and on the respective graphic the most frequently mammary tumors were the tumors of one papilla. (16 cases or 38.1 %).

All the exanimate dogs were divided according to their breed and their age in four groups. Table No.4:

Table No. 4

Mammary tumor	**Breed**				
	Terrier	**Toy**	**Sportive**	**Guardian**	**Mix**
Tumor of one papilla	9	-	3	-	4
Tumor of one mammary gland	3	-	4	-	1
Unilateral tumor of thoracic mammary glands	-	-	-	-	5
Unilateral tumor of abdominal mammary glands	4	2	-	-	1
Unilateral tumor of mammary gland	2		-	1	1
Bilateral tumor of mammary gland	-	1	-	1	-
All	**18 42.8%**	**3 7.2%**	**7 16.6**	**2 4.8%**	**12 28.5%**

Table No. 4 The frequency of mammary tumor according to the breed.

During this study was noticed that the most affected breed from the mammary tumors were Terrier and Métis. From these breeds the most affected one was Terrier (18 cases or 42.8 %).
The mammary gland tumors according to age Table no 5:

Table No. 5

Mammary tumor	**Age (years old)**			
	1-4	**4-8**	**8-12**	**over 12**
Tumor of one papilla	-	4	10	2
Tumor of one mammary gland	-	-	4	4
Unilateral tumor of thoracic mammary glands	-	2	3	-
Unilateral tumor of abdominal mammary glands	-	1	4	2
Unilateral tumor of mammary gland	-	-	3	1
Bilateral tumor of mammary gland	-	-	1	1
Tumor of one papilla	**0**	**7**	**25**	**10**
All		**16.6%**	**59.5%**	**23.8%**

The Frequency of mammary tumors according to age

The most affected age resulted from 8 to 12 years old. 25 cases (59.5 %) of the mammary gland were tumor of one papilla.

Since the development of the mammary tumor is related with sterilization, parturition, and use of inject able contraceptive estropil (ovariohisterectomy), the diagnosed dogs

with mammary tumors were classified according to this factors Table no.6

Table No. 6

Sterilized		**Reproduced**		**Contraceptive**	
sterilized	non sterilized	reproduced	non reproduced	treated	untreated
4	**38**	**5**	**37**	**34**	**8**

The frequency of mammary tumor according to dogs reproduction status

The most of the mammary tumor are discovered during the routine physical examination. Many of the dogs are exanimate because they had abnormal discourage from the gland or because of the presence of one small mass at the mammary gland. The mammary gland tumors were of different sizes. They varied from 2-3 mm to 8 cm. These tumors were more frequently localized at the caudal mammary glands. In some cases were examined the presence of some multiple tumor masses localized in one row or in two rows of the mammary glands. Many of the tumor masses were easily moveable except of them that were fixed in the muscles or in fascia. So in some cases they had peduncle, in some cases they were solid and in few cases were observed cystic and ulcerate masses. In other cases during the examination was observed diffuses edema with well defined borders between normal and abnormal tissue. In these cases were doubt for inflammatory carcinoma or mastitis. The tumor masses removed in operatory way were also histological exanimate.

The general clinical examination consisted on physical palpation of the mammary gland and of the regional lymphatic nods. The clinic of the tumors types development include was characterized from these clinical signs: the presence of the mammary gland masses, the presence of the abdominal masses that grows especially in the lymphatic nods, oral hemorrhages, noses, urinary tract, rectum, or vagina; bad smell, difficulties

during respiration, difficulties in urination and defecation, anorexia and weakness.

During the first stages of the tumors development was observed small nods under the skin. They were very strong. In some other diagnosed cases was observed an intensive growth of the mammary tumors for a very short period doubling in this way their physical sizes. The growth of the benign masses was small and slow. While the malign masses grew too soon. They appear in irregular shape, they were fixed in skin or under the skin and in some cases they were ulcerative.

The surgical treatment is actually the best way of treatment. It is the most efficacy way of the treatment of all mammary tumor except the inflammatory carcinoma. Surgical removal of these masses made possible the histological diagnose. The surgical technique applied is presented on the table no.7:

Table No. 7

Surgical technique	No of cases	%
Lumpectomy	**16**	**38.1%**
Simple mastectomy	**8**	**19.1%**
Regional mastectomy	**5**	**11.9%**
Complete unilateral mastectomy	**7**	**16.6%**
Partial bilateral mastectomy	**4**	**9.5%**
Complete bilateral mastectomy	**2**	**4.7%**
All	**42**	**99.9%**

The frequency of different surgical techniques applied

The patients with inflammatory carcinomas were presented in clinic in very advanced stages of the tumors development. In these cases the surgical treatment didn't control the progression of the tumor. The surgical technique of mastectomy was selected based on the tumors size, tumors localization, tumors consistence, and patient's condition. The unilateral mastectomy resulted with few cases of recidivism. The surgical technique was combined when the tumor masses were multiple and were located in both rows of the mammary glands. In these

case were removed all the tumor masses. In some cases the removal of the tumor was performed through 2 or 3 surgical intervention. In many of the cases ovariohisteroectomy was performed before mastectomy, to prevent the tumor cells implant in the abdominal cavity. Even this does not prevent the mammary tumors development it prevents the uterine pathologies like piometra pyrometer, metritis and eliminate the hormonal influence on the existed tumors.

The surgical treatment resulted successful in 30 dogs,13 of them had only one papillary tumor.

The surgical treatment resulted unsuccessful in 12 dogs. In these dogs dominated more the malignant forms.

Table No. 8

Mammary tumor	**Treatment results**		
	Successful	**Recidivate**	**Unsuccessful**
Tumor of one papilla	13	2	3
Tumor of one mammary gland	6	1	2
Unilateral tumor of thoracic mammary glands	4	-	1
Unilateral tumor of abdominal mammary glands	4	1	3
Unilateral tumor of mammary gland	3	1	1
Bilateral tumor of mammary gland	-	-	2
All	**30** **71.4%**	**5** **11.9%**	**12** **28.6%**

Treatment results of mammary gland tumor

From the treated dogs 5 of them recidivated. These cases were malignant tumor forms. 5 of them had metastasis mainly in lungs. The recidivism of these cases was discussed also in correlation with time factor and with mammary tumor size. (Table no. 9)

Table No. 9

Tumor size	**Recidivate 12 months after %**	**Recidivate 24 months after %**
< 3 cm	5	10
3-5 cm	20	30
>5 cm	30	40

The correlation between tumor size and time of v recidivism

When the primary tumor sizes grow, the risk of the development of the tumor metastases increases and the survival times decreases. The prognosis for the benign mammary tumors in dogs is favorable after the surgical treatment. The prognosis for the malign tumors is discussible and it depends from many factors as histological tumor type, and from the disease stage.

Most of the dogs with malignant tumors, without metastasis during the surgical treatment do not exhibit signs of the tumor for one or two years. The tumors smaller than 3 cm have a better prognosis than the tumors bigger than 3 cm (the rate of recidivism is 80% inside 2 years). The presence of different types of the tumor does not influence in the prognoses of the tumors disease.

CONCLUSIONS AND RECOMANDATIONS

- The mammary gland tumors in dogs are very frequent. They constitute about 50% of all tumors in female dogs.
- The malignant tumors of mammary gland are more frequent than benign tumors of mammary gland. The most frequent type of the malignant tumors resulted solid carcinoma 18.7%.
- The most frequent type of mammary benign tumors in dogs resulted fibrosarcoma.
- During this study resulted that the most affected breed are Terrier and Metis.
- The most affected age from the mammary tumors resulted from 8 to12 years old.
- The sterilization is a good precautionary factor for the development of mammary tumors.

- The frequency of mammary tumor is higher in bitches that have never parturition than in bitches that have parturition.
- The use of contraceptive in female dogs makes an predispose factor for the development of the mammary tumors.
- If the tumor size increases, the risk of metastasis spreading goes higher.
- After the surgical treatment the prognosis of benign mammary tumor is favorable.
- The prognosis of the malignant mammary tumor is discussable and depends from many factors like histological factor and the stage of tumors disease.
- Most of the dogs with malignant tumor, but without metastasis during the treatment period, could not exhibit tumor diseases signs for a period of 1-2 years or they have a lethal destination in a period of 3-6 months.
- The mammary tumors smaller than 3 cm. have a better prognosis and the recidivism rate is lower, While the tumors with diameter bigger 3 cm have discussible prognosis and they have bigger opportunities for their development.
- The incidence of the mammary tumor increases after 6 years old. In dogs the mammary tumor develops more around 10-11 years old.
- The development of the mammry tumors in dogs depends closely from the hormonal levels. The incidence from the mammary tumors is approximately 0.5% in sterilized bitches before their first estrus, 8% for sterilized bitches after an estral cycle, 26% in sterilized bitches after two or more cycles.
- The risk of mammary tumor can be avoided if the dogs become sterilized.
- The rate of mortality after the metastasis carcinoma removal is about 27% reported.

- Most of the deaths caused from the tumors happened inside the first year after the operation.
- The rate of recidivisms is higher in dogs with extremely invasive carcinomas compared with benign carcinomas and noninvasive carcinomas.
- The presence of the multiple tumors does not change the disease prognosis.

RECOMMENDATIONS

1. If the tumor has invaded the subcutaneous tissue and the mammary gland, then should removed the ventral muscles fascia that lied under it.
2. If the tumor has invaded the abdomen muscle, then is advised the removal of one part of the abdominal wall together with the tumor.
3. During the mastectomy of the fifth couple of the mammary gland it is also recommended the removal of the lymphatic inguinal nods.
4. When there's no presence of anomaly or enlargement, the removal of axillaries lymphatic nods together with the first mammary glands is not recommended.
5. We should always take in consideration that the tumorale masses at the same dog could be of different types. Because of this reason is recommended the removal of all tumor masses and testing them through histological way.

REFERENCES

1. Adely, W.R. (1993) Whispering between cells: electromagnetic fields and regulatory mechanisms in tissue. Frontier Perspect. 3: 21-25.

2. Bellavite, P., Andrighetto, G. e Zatti, M. (1995) Omeostasi, Complessità e Caos, un'Introduzione. Franco Angeli, Milano.
3. Bignamini M, Felisi E – "Metodologia omeopatica". Casa Editrice Ambrosiana 1999, Milano; 114-15.
4. Bistolfi, F. (1989) Radiazioni Non Ionizzanti, Ordine, Disordine e Biostrutture. Ed. Minerva Medica, Torino.
5. Coulomb B., Friteau L., Duberrtret L. – "La biafine appliquè sur des plaies épidermiques chez l'homme est chimotactique pour les macrophages et augmente le rapport IL1/IL6, Skin". Pharmacology, 1997, 10, 281-287.
6. Demarque D., Jouanny J., Poitevin B., Saint-Jean V. - "Farmacologia e materia medica omeopatica" (Arnica pag. 42-44; Gelsenium pag. 185-188; Nux Vomica pag. 308-311). Tecniche nuove. Ed. italiana lu 2000.
7. Fisher B., Redmond C., Fischer Er, Ten years of results of a randomized clinical trial comparing radical mastectomy and total with or without radiation, N. England J. Med. 1985, 312: 674-681.
8. Konig, H.L. (1989) Bioinformation. Electrophysical aspects. In: Electromagnetic bio-information (Popp et al., eds) Urban & Schwarzenberg, Munchen: 42-73.
9. Lenzi M., Bistolfi F. "Campi magnetici ed effetto ossigeno". Campi magnetici in medicina. Minerva Medica Ed. Torino (pag.387-398). 1983.
10. Marx R.E., Johnson R.P. :"Studies in the radiobiology of osteoradionecrosis and their clinical significance". Oral surgery, Oral medicine, Oral pathology. Vol. 64 (379-390). Oct 1987.
11. Oberbaum M., Yaniv I., Ben-Gal Y., Stein J., Ben Zvi N., Freedman L.S., Branski D. - "A Randomized, Controlled Clinical Trial of the Homeopatic Medication TRAUMEEL S in the Treatment of Chemotherapy-

Induced Stomatitis in Children Undergoing Stem Cell Transplantation". Cancer Aug 1, 2001/Vol. 92/N3.

12. Overgaard M, Henser MS, Postoperative radiotherapy in high risk premenopausal women with breast cancer who received adjuvant chemotherapy, N. England J.Med. 1997, 337:949.955.
13. Pathak MA, Fitzpatrick TB, Greiter F, Preventive treatment of sunburn, dermatoheliosis and skin cancer with agents. Dermatology in general medecine, 3rd, Ed. Fitzpatrick TB, Eds New York, Mc Graw Hill, 1987, 1507-1592.
14. Robles JE, Rosell D – "Experimental applications of shock waves". Rev Univ Navarra 1996 Oct-Dec;40(4):25-33. (article in Spanish).
15. Rodemann HP, Bamberg M. – "Cellular basis of radiation-induced fibrosis". Radiotherapy and Oncology 35 (1995) 83-90.
16. Roy I., Fortin A., Larochelle M. – "The impact of skin washing with water and soap during breast irradiation: a randomized study". Radiother. Oncol 2001; 58: 333-339.
17. Veronesi U., Banfi A., Salvadori B. Breast conservation in the treatment for choice in small breast cancer: long term results of randomized trial, Eur. J. Cancer, 1990, 26:668-670.
18. Weaver, J.C. and Astumian, R.d. (1990) The response of living cells to very weak electric fields: the thermal noise limit. Science 247: 459-462
19. Wells M, MacBride S: - "Radiation skin reactions". Textbook of Radiotherapy, 6th edition. Walter and Miller's Elsevier Bomford (2002) 135-59.