CLINICAL AND HISTOPATHOLOGICAL STUDY OF MAMMARY TUMORS IN FOREIGN DOGS BREEDS IN KURDISTAN REGION OF IRAQ.

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ABSTRACT

Mammary tumors in five intact bitches were evaluated at the Department of Medical Science, Faculty of Veterinary Medicine, Duhok University. Information about the breed and age of the animals, location and number of affected mammary glands, surgical outcome, tumor recurrence and survival were recorded. All the removed tumors were histologically examined and diagnosed as malignant types.

INTRODUCTION

Mammary gland tumors are the most common group of tumors encountered in dogs ranking second to skin tumors (1, 2, 3), and in female dogs, it comprise 52% of all tumors (4, 5).

Most frequently, mammary gland tumors are found in 5 years and older bitches (6). Many breeds of dogs like Dachshunds, Cocker spaniels, Toy poodles, German shepherds and mixed breed dogs have been reported to have an increased incidence of mammary tumors (7).

Clinically, canine mammary tumors occur Grossly either as single or multiple nodules, which vary from well-circumscribed nodules with stationary growth to large, and sometimes ulcerated, nodules which grow rapidly and become fixed to adjacent tissues (8).

There are multiple types of mammary tumors in dogs which are either benign or malignant; the most common malignant form of canine mammary tumor is actually a mixture of several different types of cells. For a single tumor to posses more than one kind of cancerous cell is actually rare in many species. This combination between tumors in the dog is called a malignant mixed mammary tumor and contains two parts, glandular and connective tissue (9).

Histopathologically, mammary tumors are associated with extensive infiltration of variable sized tumor cells distributed throughout the mammary gland which finally classifies the types of tumors (2, 10)

Domestically, canine breeding is very limited in Duhok area. Interestingly, regarding mammary tumors in dogs, no studies have been performed in Kurdistan region. Therefore, the objective of this study is to identify clinical and pathological characteristics of five cases of mammary tumor in bitches and surgical outcome which is according, to our knowledge, the first study in Duhok area.

MATERIALS AND METHODS

Between November 2009 and May 2013, five cases of mammary tumors in bitches were admitted to the Department of Medical science/ Faculty of Veterinary Medicine / Duhok University.

Data concerning the breed and age of the animals and the time between tumor detection by the owners to the time of examination and surgical removal were recorded on investigation cards. A thorough physical examination was performed on the animals with examination of all the mammary glands. The number and the location of affected glands per animal, the diameter and the nature of the tumors, were recorded. Radiological facility was not available for thoracic examination.

Because inhalation anesthesia was unavailable, surgery was performed using injection of repeated doses of ketamine (15 mg/kg B.W), and xylazine (2 mg/kg B.W) intramuscularly after subcutaneous administration of atropine sulphate (0.04 mg/kg B.W). Under strict aseptic conditions (clipping and shaving of the ventral abdominal region, from the xiphoid to the pubis, and skin scrubbing with povidone iodine), simple mastectomies were performed with the animals placed in supine position. An elliptical skin incision was made around the base, and, 1 cm distance far from the apparent edge of the affected mammary gland. Blunt dissection was used to separate the affected mammary gland from the underlying tissues with ligation of the bleeding vessels. The subcutaneous tissues were closed with simple continuous pattern using No.2/0 chromic cat gut and the skin with simple interrupted using No.0 silk. Intramuscular injection of penicillin (10mg/kg B.W.) and streptomycin (10mg/kg B.W) was administered one hour prior to the operation and continued for 4 successive postoperative days. A daily wound dressing was performed with removal of the skin stitches in the 10^{th} postoperative day.

Removal of the adjacent lymph nodes or ovariorectomy was not performed on the animals.

Histopathological examination of tissue samples obtained from the tumors was performed at the department of the pathology, Duhok research center, Faculty of Veterinary Medicine. The tissue samples submitted in 10% neutral buffered formalin were embedded in paraffin wax. Paraffin sections were cut (4 μm thick) and routinely stained with haematoxylin and eosin (H & E) for identification of tumor types according to (11).

Postoperative follow up information about tumor recurrence and survival were obtained from the owners through telephone calls for more than 3 years.

RESULTS

All the five dogs were intact (unspayed) virgin females, three of them were German shepherd police dogs (explosive detector dogs or bomb dogs) fed on concentrated Pelleted commercially made food while the remaining this other 2 were Spanish terrier dogs (house hold pets) fed on house made food. No weight loss was observed by the owners and the animals had a normal or slightly reduced appetite. Physical examination showed normal rectal temperature, respiratory and pulse rate, mucous membrane color, and thoracic auscultation.

In German shepherd, the duration of the mammary gland tumors before admission was between 10 - 30 days, while in the two Spanish terrier dogs, it was 6 and 10 months. Inspection of the affected mammary glands revealed the presence of painless hard multiple nodules within the affected mammary tissue. No discoloration or ulceration of the skin covering the affected mammary glands and no bleeding was noticed. The size (diameter) of the tumors varied from (2 - 9 cm). The breed and the age of the animals, the location of the affected mammary glands and the types of tumor are shown in table 1.

Table1. Show the breed and the age of the female dogs, the affected mammary gland, the size (maximum diameter) of the tumor, and the type of the tumor and survival time after the operation.

Case No. /Breed	Age	Location of the affected gland/ Size (diameter)	Type of the tumor	survival time after operation
1. German shepherd	3 years	Right cranial thoracic/ 3cm	Tubulopapillary adenocrcinoma	>3 year survival
2. German shepherd	9 years	Right cranial abdominal/ 3 cm And Right caudal abdominal/ 4 cm	Malignant Mixed tumor	Recurrence of the tumor and animal death.
3. German shepherd	5 years	Right caudal abdominal/ 6 cm	Malignant mixed tumor	>2 year survival, and animal death
4. Spanish terrier	12 years	Right caudal thoracic/ 9 cm And left inguinal/ 2 cm	Papillary adenocarcinoma	The animal died with one year survival.
5. Spanish terrier	12 years	Left caudal abdominal/ 8 cm	Fibrosarcoma	>3 year survival.

The results showed that these tumors occurred more commonly in the glands of the right mammary chain (4 cases). On palpation, all these tumors were painless with multiple firm nodules easily separated from the underlying body wall with no evidence of deep invasion. Slight edema was noted in the adjacent tissues. No nipple deformity and no bleeding or ulceration of the overlaying skin was observed. All the five bitches survived after the operation uneventfully without complications.

Follow up information revealed death of two animals, a German shepherd and a Spanish terrier. The German shepherd dog, (case No. 2, Fig. 3), developed a new tumor in the right inguinal mammary gland 6 months after mastectomy. The animal was re-operated for mastectomy of the gland. The animal died 4 months later.

The Spanish terrier, (case No.4, Fig1), died one year after the operation. The cause of the death was not defined in these two animals, because no necropsy was performed.

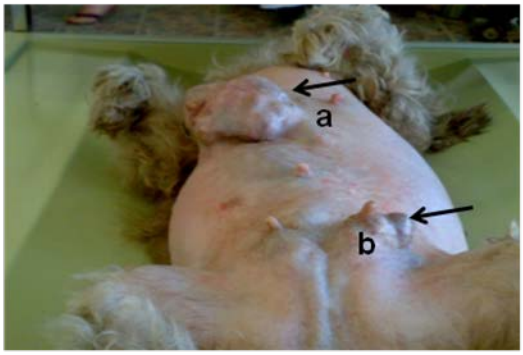

Figure 1 A Spanish terrier having a large mass in the right caudal thoracic mammary gland (arrow a) and a small mass in the left inguinal mammary gland (arrow b).

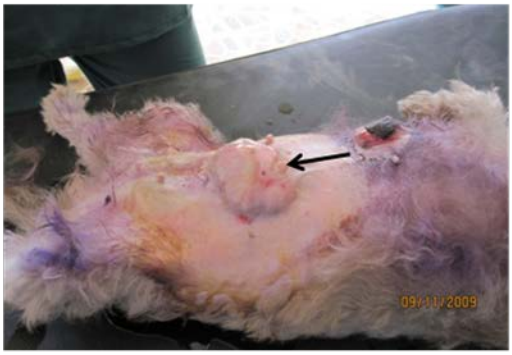

Figure 2. A Spanish terrier having a large mass in the left caudal abdominal mammary gland (arrow).

Figure 3. Development of tumor in the right inguinal mammary gland in German shepherd dog 6 months after mastectomy of both right cranial and caudal abdominal mammary gland

HISTOPATHOLOGICAL RESULTS

Results of histopathological examination of the five mammary gland tumors specimens showed that two were adenocarcinoma, two mixed tumors and one fibrosarcoma.

The adenocarcinoma was characterized by either tubulopapillary type with moderate nuclear and cellular pleomorphism as showing in (figure. 4), while the papillae or papillary adenocarcinoma appeared as finger projection which is supported by a fine fibrovascular stroma with proliferating neoplastic epithelial cells in the form of papillary projections and presence of mitotic figures as showing in(figure 5).

Specimens with malignant mixed mammary tumor showed both epithelial and myoepithelial components with transformation into chondroid as showing (figure 6).

The fibrosarcoma was characterized by fusiform cells proliferating in a different pattern showing hyperchromatic nuclei as showing (figure 7).

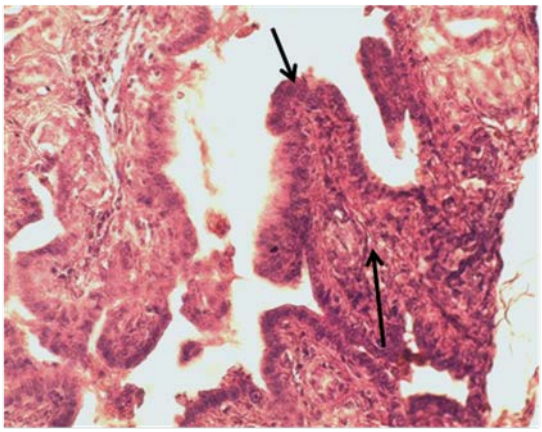

Figure 4: adenocarcinoma, tubulopapillary type, with moderate nuclear and cellular pleomorphism (upper arrow). The papillae are supported by a fine fibrovascular stroma (lower arrow). 20 x. H&E.

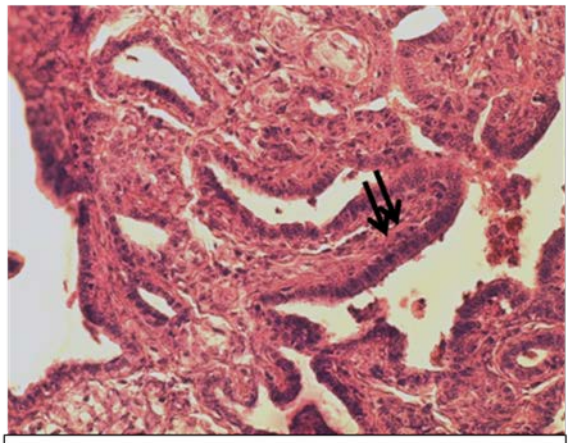

Figure 5: Papillary adenocarcinoma. Proliferating neoplastic epithelial cells in the form of papillary projections and presence of mitotic figures. H&E, 20×

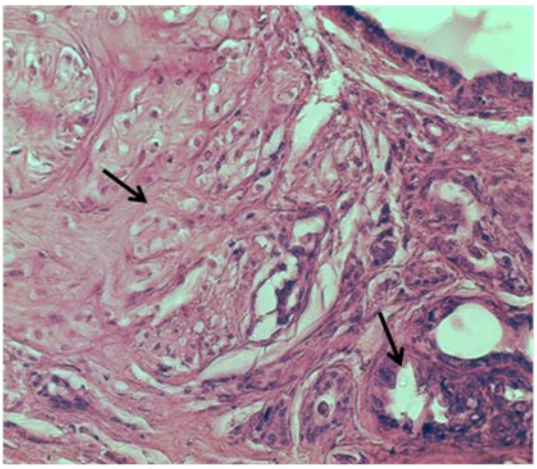

Figure 6: Malignant mixed mammary tumor. Tumor tissue showing epithelial (Right arrow) and myoepithelial components with transformation into chondroid tissue left (arrow). H&E, 40×

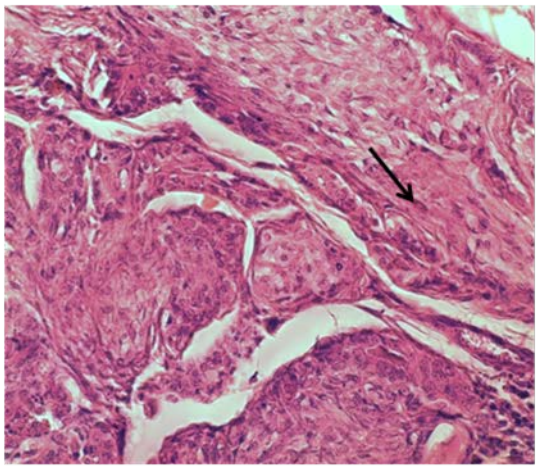

Figure 7: Fibrosarcoma. Fusiform cells proliferating in a different pattern showing hyperchromatic nuclei (arrow) . H&E, 40×

DISCUSSION

In this study, the tumors of five bitches were surgically removed. Surgery is considered as the best method for treating of most types of mammary gland tumors in dogs, with exception of certain types of mammary gland tumors like inflammatory carcinoma and distant organ metastasis. The goal of surgery is to remove the entire neoplasm by the simplest procedure available (8).

Other types of treatment which are used for inflammatory carcinoma and inoperable tumors, like radiation therapy, chemotherapy, ovariectomy, and immunotherapy, proved to be in effective (12).

One study showed that after a malignant mammary tumor develops, there was no effect of ovariectomy on tumor progression (13).

In another study, ovariohysterectomy at the time of tumor removal had no effect on survival with approximately 60% of dogs with malignant tumors dying within 2 years of surgery whether they were spayed at the time or not (14).

The size of the tumors observed in the two Spanish terriers was large. The owners observed the swelling in the mammary gland but they were not worried about it because the animals were in normal health condition, and showed no suffering or pain. The sizes of the tumors in were comparatively varied and their guards brought the dogs as soon as they noticed an abnormal swelling of the mammary gland because of the value of these animals.

In this study, all the bitches were intact unspayed females. Hormones have an important role in tumor development; they cause structural and functional changes in mammary glands. The risk of developing mammary gland tumors increases as the number of estrous cycles increases. The risk of developing mammary gland tumors is 0.05% if the bitch is spayed before the first estrous cycle and the risk increases to 8% if the bitch is spayed before the second estrous cycle and to 26% if the bitch is spayed after the second estrous cycle. Progestin injection for prevention of estrous also increases the incidence of tumor development (6, 7, 15).

Mammary gland tumor samples should be histologically evaluated to explore the types of tumor cells to help in identifying the prognostic variables which allowed disease behavior to be predicted (16, 17, 18).

In canine mammary tumor, types of tumor are important factor for diagnosis and treatment. Our study showed all the histologically examined tumors samples were diagnosed as a malignant type. The malignant mixed tumors are familiar expression for pathologist and clinician and some pathologist used it to describe with a single malignant component, epithelial or mesenchymal type (2, 19, 20, 21). The variety of histological types has produced conflicting concepts related to classification compared with a present study, although few cases was recorded in our study but all of them was diagnosed as malignant tumors which is in agreement with many researches that showed that the incidence of the malignant tumor are more than that of benign tumors in dogs (22, 23). The weakness in this study was the small number of cases, the lack of radiological facilities which help in detection of distant metastasis especially to the lung; also, regional lymphadenectomy was not performed. Therefore, further study is important to confirm beside epidemiological data and molecular analysis with consideration would be taken in the progression event of tumor.

دراسة سريرية ونسيجية مرضية لأورام الغدة اللبنية في اناث الكلاب في منطقة كردستان العراق

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الخلاصة

تضمنت الدراسة تقيم حالات أورام الغدد اللبنية في خمس من أناث الكلاب أحيلت ألى فرع العلوم الطبيه/ هيئة العلوم البيطرية / جامعة دهوك. تم تسجيل نوع و أعمار الحيوانات وموقع الغدد المصابه و عددها. أستئصلت الأورام جراحيا" و تم متابعة الحيوانات وتسجيل ظهور الورم وفترة بقاء الحيوانات حية بعد أزالة الأورام. فحصت كل الأورام المستأصلة نسيجيا" لتحديد أنواعها.

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