

# **A Case Report on Treatment of Mammary Tumor in Dog**



**A Clinical Report Submitted**

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# A Case Report on Treatment of Mammary Tumor in Dog



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## **ABSTRACT**

A female Golden Retriever dog was brought to the Teaching and Training Pet Hospital and Research Center (TTPHRC) presenting signs of weakness and lethargic behavior. There was a mass found in the mid-inguinal area. An incision was made on the skin extending to the mass. Toward the end of the prepubic area, the mass grew from the mid-inguinal region, enveloping the third pair of teats. After physical examination, the mass was tentatively diagnosed as a malignant tumor. The owners were thoroughly informed about the risks associated with the surgery by the surgeons, who subsequently carried out the surgical excision with their permission. Since such an occurrence can be prevented by surgical excision in the chosen area. Tumors with the affected teats were removed successfully. On postoperative observation for one-month period, the animal was totally healthy without showing any abnormal symptoms

**Keywords:** Mammary, Tumor, Malignant, Surgical excision.

# CHAPTER 1

## INTRODUCTION

Canine mammary gland tumor (MGT) is the most common neoplasia, accounting for 50% to 70% of all tumors in intact female dogs (Choi et al., 2022). Most malignant tumors are comprised of epithelial tumors or carcinomas (Benevento et al., 2016). The uncontrolled growth of abnormal cells can spread to nearby tissues characterizes the diverse group of disorders associated with cancer (Goldschmidt et al., 2017). It is among the most prevalent causes of death in canines. Every year, 4 million new cases of cancer in dogs are diagnosed (Sung et al., 2021). Historically, roughly 50% of MGT are considered to be malignant (Moe, 2001). Most malignant mammary tumors develop in middle-aged (5–7 years of age) and elderly (7–8 years of age) female dogs. According to Sonenshein et al. (1991), the risk of developing mammary tumors in the bitch is lower if they have been thin at 9-12 months of age. In addition, the risk of developing mammary tumors increases with the delay in spaying (Salas et al., 2015). Another study found that the incidence of canine mammary tumors in dogs spayed before the first heat was 0.05%, and it increased as the number of heats progressed, being 8% and 26% after the first and second heat, respectively. In females spayed after their third heat, the risk of developing mammary tumor was similar to that of a non-spayed female dog (Schneider et al., 1969). In female dogs, ovarian steroids stimulate the normal growth of mammary tissue under physiologic conditions (Quiroga et al., 2005). Moreover, some reports have shown that estrogens and synthetic progestins, which are commonly used in veterinary practice, seem to enhance tumor formation (Routeman, 1992; Selman et al., 1995, Stovring et al., 1997). However, the proliferative effect in the epithelium can create the perfect environment for neoplastic proliferation. Ovarian hormones, mainly estrogens and progesterone, play an important role in the development of mammary tumors (Kumaraguruparan et al., 2006). Nutritional factors are of special interest due to the ability of adipose tissue to synthesize some steroid

hormones. Adipose tissue is an important source of estrogens, owing to its aromatase activity, which converts androgens to estrogens (Simpson, 1996). Dogs may present with nonspecific signs, and those with inflammatory carcinoma present with extensive inflammation of the involved mammary glands with edema and pain (Sorenmo, 2003). Although MGT is easily detected through physical examinations, radiography, ultrasonography, computed tomography (CT), fine-needle aspiration of the regional lymph nodes, and biopsy could be performed to evaluate metastasis. Surgical removal of the affected tissues remains the most accepted treatment for MGT (Karin et al., 2020). Surgical excision alone yields unsatisfactory results in patients with lymphatic invasion due to high recurrence. Several prognostic factors, including age, tumor size and stage, clinical signs, lymph node involvement, histopathologic type, and the presence of hormone receptors, have been identified (Clemente et al., 2010).

In this clinical report, the detailed procedure of the diagnosis, surgical intervention followed by excision and short-term follow-up of a mammary adenocarcinoma in a 6-year-old female dog will be discussed which may help as a guideline for small animal practitioners.

## **CHAPTER 2**

### **MATERIALS AND METHODS**

#### **2.1 Case History**

A 6-year-old, female, Golden retriever dog with signs of weakness, lethargy and inappetence was presented to the Teaching and Training Pet Hospital and Research Center (TTPHRC), Purbachol, Dhaka. It was a pet dog with an available history of 3 months. The owner claimed the presence of the overgrown portion at the mid-inguinal region expanding from the mid-inguinal region up to the third pair of teats towards the end of the pre-pubic area. There was available information on the vaccination and deworming of the dog

#### **2.2 Clinical Findings**

Normal temperature and other physical indicators within their normal range were found during the clinical evaluation. Pain was detected by palpating the overgrown area. A regular examination and the collection of a blood sample were both done. Using gauze to wrap around the patient's mouth, the patient was placed in lateral recumbency to get a blood sample. Blood was collected using a syringe and a butterfly needle after the collection region had been disinfected with alcohol. Parameters within the normal range were found after routine tests for blood.

#### **2.3 Treatment**

The case was corrected surgically according to a standard procedure.

#### **General considerations**

This condition could be hereditary and age or breed-specific. During exploratory surgery, major blood vessels might be at risk.

### **2.3.1 Premedication and Anesthetics**

Xylazine hydrochloride (Xylazine, Indian Immunological Ltd, India, @ 1 mg/kg body weight) was intramuscularly administered as premedication. For induction and maintenance combination of diazepam (Sedil, Square Pharmaceuticals Ltd, Bangladesh, @ 0.5 mg/ kg body weight) and Ketamine hydrochloride (Ketalar, Popular Pharmaceuticals Ltd, Bangladesh, @ 5 mg/kg body weight) was intravenously used.

### **2.3.2 Suture materials**

During the surgery both absorbable and non absorbable suture materials were used. In order to close the muscle layer and subcutaneous fascia absorbable suture material Vicryl (Vicryl, 2-0, Ethicon, Johnson and Johnson Ltd, India) and Catgut (2-0) were used. Non-absorbable suture material silk was used to close the skin for better strength.

### **2.3.3 Surgical Procedure**

An incision was done on the ventral mid-inguinal region along the length of the neoplasm. The skin was separated from the underlying tissue with a combination of incision with the scalpel blade and blunt dissection with scissors. After the initial incision, the skin separation was initiated with the scalpel. Blunt dissections were made with scissors to avoid cutting any major arteries or veins. The aim was to remove the entire skin of the affected area. The entire skin that covered the affected area was separated with small incisions followed by more blunt dissections. With this procedure, the stalk of the neoplasm was reached gradually. Ligation on the stalk was performed with Polyglactin 910 (Vicryl®, Ethicon). Multiple ligations were given to avoid any chances of excessive bleeding. Ligation was completed which was followed by excision of the tumor mass with



the scalpel. Following the excision, some excess skin was removed followed by suturing the remaining skin. The muscles were sutured with a combination of ford interlocking and simple continuous suture. The subcutaneous tissue was sutured with subcuticular suture followed by cross mattress suture on skin.

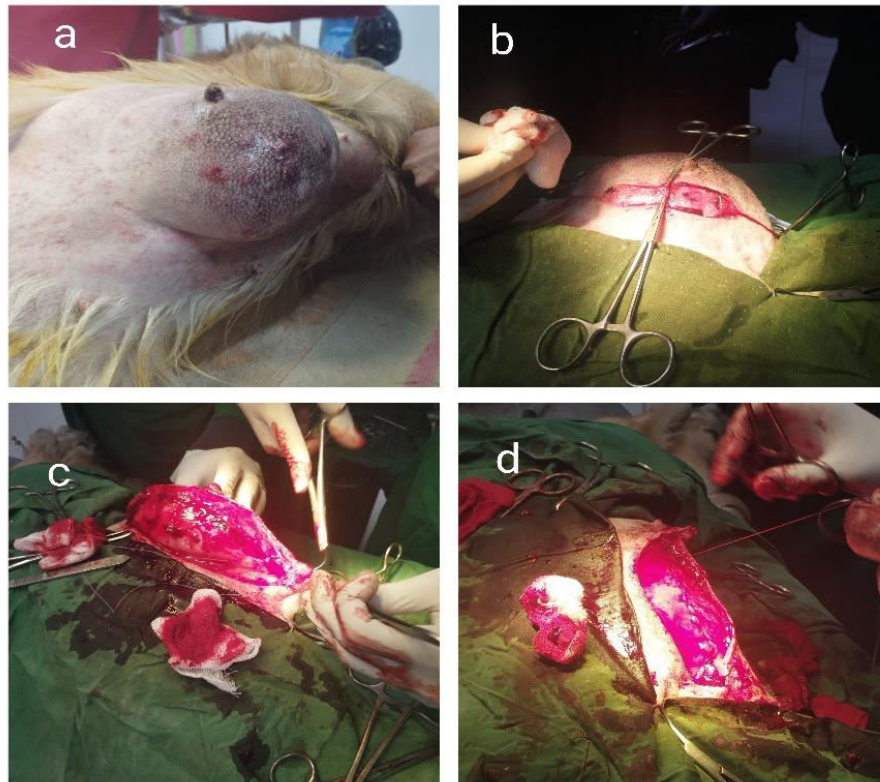


Figure 1: (a-d)

**a).** A large mammary tumor in a 6-year-old female Golden Retriever, non-inflammatory rapidly growing tumor was formed in the first three pairs of teats, about 4 cm in diameter **b).** Incision through the subcutaneous tissue to the fascia of the external abdominal wall avoiding mammary tissue. **c).** Hemorrhage was controlled with artery forceps and ligation. **d).** Skin was sutured by walking sutures and subcuticular sutures.

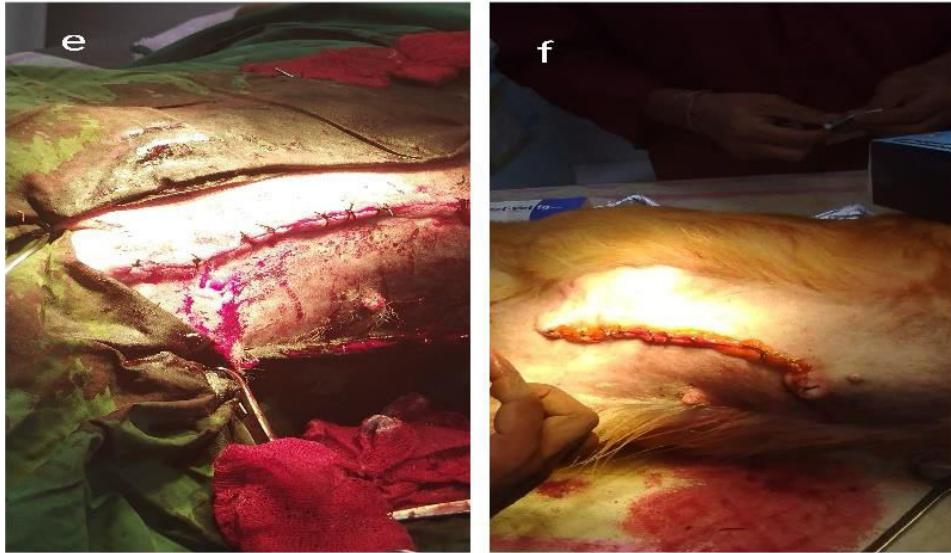


Figure 2: (e-f)

e) Appose skin edges with appositional sutures. Simple interrupted suture using silk was applied to suture the skin f) Suture area after removal of the affected mammary glands

### 2.3.4 Post-Operative Care

As postoperative care broad spectrum antibiotics ceftriaxone (Trizon vet, 500mg, ACME, Pharmaceuticals Ltd, Bangladesh, 30 mg/kg body weight) was administered intramuscularly for 7 days and painkiller meloxicam (Melovet, 10ml vial, TECHNO, Pharmaceuticals Ltd, Bangladesh, 0.2 mg/kg body weight) was administered subcutaneously for 3 days. Povidone iodine (Betadine 5%, Mundipharma, Bangladesh) was applied to the lesion for 7 days. The dog was advised to restrict exercise and remain in confinement for 12 days postoperatively for complete healing. Skin sutures were removed on the 14th postoperative day. No postoperative complications were observed in either anesthesia recovery or wound healing. A remarkable improvement in the physical conditions and disappearance of all clinical signs of the dog was seen after the surgery.

## **CHAPTER 3**

### **RESULTS**

In complete blood count all the parameter of blood cell were in normal range. The animal was fasting for 6 hours before surgery. The animal was anesthetized smoothly by using of pre-anesthetics and anesthetics. The dog was premedicated with a combination of Xylazine hydrochloride (1 mg/kg B. W. IM) and atropine sulphate (0.04 mg/kg B. W). After that, the dog was prepared for aseptic surgery. The animal was maintained during surgery with a mixture of injections of injected ketamine hydrochloride at 10 mg/kg body weight and injections of injected diazepam at 10 mg/kg body weight. The ventral abdominal region was prepared for operation with the use of all aseptic precautions. The tumor was removed by surgically. The animal showed normal signs after regaining consciousness. Normal eating and drinking were continued after 12 hours of surgery. The suture on the ventral side of the pubic region took about 14 days to heal. In the above-mentioned treatment, the animal recovered smoothly and none of the previous symptoms were seen during the follow-up period.

### **DISCUSSION**

Adult female dogs comprise almost all of canine mammary tumor cases. According to Schneider (1970), the majority of bitches with mammary tumors are between the ages of seven and eleven. Following the surgery, a 4 cm in diameter sample of the mammary mass was extracted. Although mammary masses can range in size from 2 to 3 mm to 8 cm, one study indicated that malignant tumors were substantially larger than benign tumors (4.7 versus 2.1 cm) (Sorenmo et al, 2009). So, in the basis of size this tumor was malignant. In this case the only one mammary tumor find in the cranial part of the mammary gland. According to Sorenmo et al. (2009), 66% of dogs present with multiple tumors, while the caudal mammary glands are the most common location for canine breast cancers.

In this case the tumor was pedunculated, solid, fixed and round demarcation which is non-ulcerated and covered with skin. But according to(Sorenmo et al, 2009). Most masses are easily movable, but occasionally they are fixed to the underlying muscle or fascia. Masses may be sessile or pedunculated, solid or cystic, ulcerated or covered with skin and hair. Inflammatory carcinoma or mastitis should be suspected if the glands are diffusely swollen with poor demarcation between normal and abnormal tissue. Inflammatory carcinomas are often ulcerated.so it was non-inflammatory tumor.

While physical examinations are a good way to detect metastatic disease (MGT), other diagnostic methods that can be used to assess metastasis include radiography, ultrasonography, computed tomography (CT), fine-needle aspiration of the regional lymph nodes, and biopsy (Karin et al., 2020). On the basis of physical examination ,ultrasonography and complete blood count the author diagnosed this mass as mammary tumor. There are few reports on non-surgical therapy techniques' effectiveness. In certain cases, chemotherapy can be helpful in the management of malignant tumors. It has not been demonstrated that postoperative adjuvant chemotherapy increases survival rates or results in dogs or cats (Simon et al., 2006; McNeill et al., 2009). Surgical removal of the affected tissues remains the most accepted treatment for MGT (Karin et al., 2020). So, the tumor removed by surgery.

Xylazine hydrochloride (Xylaxin, Indian Immunologicals Ltd, India, 1 mg/kg body weight) was intramuscularly administered as premedication. Xylazine is an alpha-2 adrenergic agonist that show its agonist activity at presynaptic alpha-2 adrenergic receptor that results in decrease in release of norepinephrine from adrenergic nerve terminals in central nervous system and periphery. This cause sedation, decreased sympathetic activity, analgesia and hypotension. It acts as good muscle relaxant and provide moderate to heavy sedation. Vomiting is frequently seen in dog and cat in case of premedication with xylazine. Similar drug was used by Shivakumar et al.,2014 to correct mammary gland tumor in dog as premedication and found effective as premedicating agent.

Combination of diazepam (Sedil, Square Pharmaceuticals Ltd, Bangladesh, 0.5 mg/ kg body weight) and ketamine hydrochloride (Ketalar, Popular Pharmaceuticals Ltd, Bangladesh, 5 mg/kg body weight) was intravenously used as main anesthetics during the surgery. Diazepam works primarily on limbic system, thalamus and hypothalamus. It act as a good sedative and have muscle relaxation property but have very poor analgesic effect. On the other hand, ketamine is a dissociative anesthetic and have glutamate antagonist effect which inhibits neurotransmission. Ketamine is a very good analgesic and have sedation property but doesn't have muscle relaxation effect. So, the combination of diazepam and ketamine provide maximum anesthetic effect and can be used safely. This combination has been used by Shivakumar et al., 2014 to get maximum anesthetic effect in mammary gland tummar surgery.

An elliptical skin incision was made, and a forcep was used to separate the mass of the tumor. Using chromic catgut no. 2-0, vessels were ligated, and a big tumor was excised from the base. For the muscle, 2-0 no. chromic catgut was used to close the incision in a standard manner. A basic interrupted suture using silk was used to close the skin incision.

Ceftriaxone (Trizon vet, 500mg, ACME, Pharmaceuticals Ltd, Bangladesh, 30 mg/kg body weight) was administered intramuscularly for 7 days as postoperative treatment to prevent secondary bacterial infection. Ceftriaxone is a third generation antibiotic from cephalosporin family that selectively and irreversibly inhibits bacterial cell wall synthesis by binding to trans peptidases. It is a bactericidal antibiotic and indicated to prevent variety of bacterial disease and secondary bacterial infection. Meloxicam (Melvet, 10ml vial, ACME, Pharmaceuticals Ltd, Bangladesh, 0.2 mg/kg body weight) was administered subcutaneously for 3 days as pain killer after the surgery. Meloxicam is a non-steroidal anti-inflammatory drug that inhibit cyclooxygenase enzyme to prevent prostaglandin synthesis which is a mediator of inflammation. This drug in indicated in fever, pain and inflammation hence, commonly used as postoperative painkiller.

Povidone iodine was applied into the wound as an antiseptic in order to prevent bacterial contamination into the wound as well as enhance the wound healing process. Same

postoperative treatment has been used by Kamble et al., 2016 in correction of mammary gland tumor. The research found that 77% of the dogs required repeat surgery and that 58% of the pups acquired new tumors on the opposite side of the mammary chain following the initial mastectomy (Stratmann et al., 2008). As a result, the patient's prognosis is still poor, and there's a chance the tumor will return.

## **Conclusion**

Mammary adenocarcinoma/ mammary tumor (MT) is quite a common occurrence in female dogs of any breed. Common signs include lethargy, loss of appetite and loss of weight along with palpable neoplastic mass beneath the skin of the animal. Surgical removal of the neoplastic mass is recommended in patients with a palpable neoplastic mass that is in danger of becoming metastatic.

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