

Mammary Gland Tumors—Dogs

Basics

OVERVIEW

- Benign tumors or cancer (malignant tumors) of the breast (mammary glands) in dogs; 50-70% of all tumors in female dogs
- “Mammary” refers to a breast or mammary gland
- The mammary glands produce milk to feed newborn puppies; they are located in two rows that extend from the chest to the inguinal area; the nipples indicate the location of the mammary glands
- Approximately 50% of breast tumors in dogs are cancerous (malignant); an individual dog may have both benign and malignant tumors
- About 70% of dogs have multiple tumors in the mammary chain

GENETICS

- Some genes are identified frequently in cancer of the mammary glands
- Mutations of *BRCA-1* and *BRCA-2* reported in English springer spaniel dog mammary tumors

SIGNALMENT/DESCRIPTION OF PET

Species

- Dogs

Breed Predilections

- Toy and miniature poodles, English springer spaniels, Brittany spaniels, cocker spaniels, English setters, boxers, English pointers, German shepherd dogs, Maltese, Doberman pinschers, and Yorkshire terriers have been reported to have an increased risk of developing breast or mammary tumors compared to other breeds
- 71% of all female beagles developed at least one mammary tumor

Mean Age and Range

- Median age—about 9-11 years (malignant) and 7-9 years (benign)
- Uncommon in dogs less than 5 years of age

Predominant Sex

- Female; extremely rare in males

SIGNS/OBSERVED CHANGES IN THE PET

- Usually slow-growing single or multiple masses associated with a nipple—about 70% of affected pets have multiple tumors; caudal mammary glands are more commonly affected
- May have superficial loss of tissue on the surface of the skin over the mammary tissue, frequently with



inflammation (known as “ulceration”), warm, painful to touch, with fluid under and around (known as “edematous”) when it is an inflammatory carcinoma

- Inflammatory carcinoma—malignant behavior (distant metastasis, general illness)

CAUSES

- Unknown; likely hormonal

RISK FACTORS

- Age
- Small breed dog
- Hormone influence (see prevention section); treatment with progestins and estrogen in combination
- Early-onset (9-12 months of age) obesity in female dogs may increase risk for breast tumor development; trim body condition is associated with a protective effect

Treatment

HEALTH CARE

- Surgery—primary mode of treatment
- Chemotherapy—may be effective and indicated when high risk of metastasis or recurrence; microscopic evidence exists of either lymphatic or blood vessel (known as “vascular”) invasion, high grade, stage III or higher

SURGERY

- Consideration will be made for age, tumor size, number of tumors, history of tumors and clinical staging
- Type of surgery is determined by intent—curative with wide margins, preventive with chain removal, palliative for advanced disease
- Most dogs with inflammatory carcinoma are poor surgical candidates
- 58% of dogs having a regional mastectomy will have a new tumor develop on that side in the chain, if initial tumor is malignant, this jumps to over 70%
- Local surgical removal of a single breast or mammary tumor (a simple mastectomy) with wide and deep margins (at least 2 cm in all directions)—current recommendation
- Spay or ovariectomy (OHE) in intact bitches at time of surgical removal of the breast or mammary tissue (mastectomy) may enhance survival

Medications

Medications presented in this section are intended to provide general information about possible treatment. The treatment for a particular condition may evolve as medical advances are made; therefore, the medications should not be considered as all inclusive

- Your dog's veterinarian may consult a veterinary oncologist (cancer specialist) for additional or updated information regarding chemotherapy
- Chemotherapy with doxorubicin, alternative drugs include carboplatin, gemcitabine, 5-fluorouracil, cyclophosphamide, peri-operative desmopressin for grade 2-3 carcinoma may be considered
- Anti-inflammatory and possible chemotherapy for inflammatory carcinomas

Follow-Up Care

PATIENT MONITORING

- As suggested by your dog's veterinarian and/or by a consulting veterinary oncologist (cancer specialist)
- Physical examination, abdomen ultrasound and chest x-rays (radiographs)—1, 3, 6, 9, and 12 months after treatment

PREVENTIONS AND AVOIDANCE

- Spayed before first heat or estrous cycle—0.5% risk of developing breast or mammary tumors compared to intact bitch; spaying before the first heat or estrus is suggested to markedly decrease the likelihood of developing mammary tumors; an “intact bitch” is a female dog capable of reproducing
- Spayed before second heat or estrous cycle—8.0% risk of developing breast or mammary tumors compared to

intact bitch

- Spayed after second heat or estrous cycle—26% risk of developing breast or mammary tumors compared to intact bitch
- Spayed after 2.5 years of age—no sparing effect on risk of developing breast or mammary tumors

POSSIBLE COMPLICATIONS

- Infection following surgery
- Splitting open or bursting along the incision line (known as “dehiscence”) following surgery
- Reduction of bone-marrow activity (known as “myelosuppression”), resulting in low number of red blood cells, white blood cells, and/or platelets, with chemotherapy
- Blood-clotting disorder (known as “disseminated intravascular coagulopathy” or “DIC”) with some types of breast or mammary tumors (especially inflammatory carcinomas)
- Distant spread of the cancer (known as “metastasis”) and death

EXPECTED COURSE AND PROGNOSIS

Varies with type of breast or mammary tumor (for example, benign tumor or cancer), size, lymph node status and presence or absence of spread of cancer (metastasis); stage of cancer (WHO 1-V); 50% of canine mammary tumors are malignant; 50% of these metastasize; 58-70% of dogs will develop another tumor in the mammary chain on the side where removal occurred

- Mammary sarcoma carries a worse prognosis
- Inflammatory carcinoma mean survival time is less than 3 months
- Grade of the cancer (determined by microscopic examination of biopsy, known as “histologic grade”), invasion into blood vessels (known as “intravascular growth”) or regional lymph nodes, and presence of necrosis (areas of death of tissues) affect prognosis

Key Points

- Never watch a breast or mammary nodule to “see what happens”—a breast or mammary lump should never be left in place and observed
- Always make a plan for evaluation and possible surgical removal of any lump in the mammary gland(s)
- Early detection and surgical intervention is best
- Spaying before the first heat or estrus markedly decreases the likelihood of developing breast or mammary tumors