

Mammary Gland Tumors—Dogs

Basics

OVERVIEW

- Benign tumors or cancer (malignant tumors) of the breast (mammary glands) in 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 50% of dogs have multiple tumors in the mammary chain

GENETICS

- Genetic basis is possible; some genes are identified frequently in cancer of the mammary glands
- P53 gene frequently altered (known as “mutated”) and is over expressed (over expression is a situation in which the gene produces too much of its effect or products; suspected that many cancers are caused by over expression of certain genes [Merriam-Webster Medical Dictionary])
- C-erb B2 gene frequently over expressed in cancer
- Mutations of BRCA-1 reported in some dog mammary tumors

SIGNALMENT/DESCRIPTION OF PET

Species

- Dogs

Breed Predilections

- Toy and miniature poodles, English springer spaniels, Brittanys, 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

Mean Age and Range

- Median age—about 10.5 years (range, 1–15 years of age)
- 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 50% of affected pets have multiple tumors
- May have superficial loss of tissue on the surface of the skin over the mammary tissue, frequently with inflammation (known as “ulceration”)
- May be freely movable—implies benign behavior
- May be fixed to skin or body wall—implies malignant behavior or cancer

CAUSES

- Unknown; likely hormonal

RISK FACTORS

- Circumstantial evidence incriminates hormone treatment with progestins and estrogen in combination, prolactin, and growth hormone
- Early-onset obesity in female dogs may increase risk for breast tumor development

Treatment

HEALTH CARE

- Surgery—primary mode of treatment
- Chemotherapy—may be effective and indicated when microscopic evidence exists of either lymphatic or blood vessel (known as “vascular”) invasion

SURGERY

- Local surgical removal of a breast or mammary tumor (such as a simple, regional, or unilateral [one-sided] mastectomy) with wide and deep margins (at least 2 cm in all directions)—may be as effective in terms of disease-free interval as radical bilateral [both sides] mastectomy
- 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 Experimental chemotherapy protocols (such as inhalation chemotherapy) for breast cancer that has spread (known as “metastatic mammary carcinoma”) are being conducted; consult with a veterinary oncologist to explore alternative currently available chemotherapy options

Follow-Up Care

PATIENT MONITORING

- As suggested by your dog's veterinarian and/or by a consulting veterinary oncologist (cancer specialist)
- Physical examination 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: these dogs are 700% more likely to develop breast cancer as dogs spayed before first heat cycle

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 and presence or absence of spread of cancer (metastasis)
- Surgery for tumors that have not spread may be curative
- Median survival after surgical removal of the breast or mammary tissue (mastectomy) with tubular adenocarcinoma—24.6 months
- Median survival after surgical removal of the breast or mammary tissue (mastectomy) with solid carcinoma—6.5 months
- Benign tumor—excellent prognosis after surgical removal of the breast or mammary tissue (mastectomy)
- Carcinoma less than 5 cm in diameter—usually a good prognosis, if excision is complete
- Regional lymph-node involvement, confirmed by microscopic evaluation, makes the prognosis worse
- Grade of the cancer (determined by microscopic examination of biopsy, known as “histologic grade”), invasion into blood vessels (known as “intravascular growth”), and presence of necrosis (areas of death of tissues) affect prognosis
- Presence of estrogen receptor and/or progesterone receptor makes the prognosis worse

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