MAMMARY GLAND TUMORS IN CATS
(BREAST TUMORS IN CATS)

BASICS

OVERVIEW
- Cancerous (malignant) and benign tumors of the breast (mammary glands) in cats

GENETICS
- Unknown
- Siamese and domestic shorthair—may have twice the risk of other breeds

SIGNALMENT/DESCRIPTION of ANIMAL

Species
- Cats; breast (mammary gland) tumors are the third most common type of tumor seen in cats

Breed Predilections
- Siamese and domestic shorthair—higher reported incidence rates than other breeds

Mean Age and Range
- Mean—10 to 12 years of age
- Range—9 months to 23 years of age

Predominant Sex
- Spayed females

SIGNS/OBSERVED CHANGES in the ANIMAL
- Firm, nodular mass, which may adhere to the skin, but not to underlying abdominal wall
- Approximately 60% of patients have multiple gland involvement; 33% have simultaneous involvement of both right and left mammary gland chains
- Any or all glands may be involved; slightly higher incidence observed for the two cranial glands (located near the front legs)
- Nipples—often red and swollen; may have tan or yellow fluid discharge
- Ulceration—noted in 25% of patients
- Infiltrated lymphatic vessels—may appear as subcutaneous (that is, under the skin), linear, beaded chains
- Rear legs—may have fluid build-up (known as "edema") and be uncomfortable; temperature to rear legs may be abnormal owing to presence of tumor blocking circulation

CAUSES
- Unknown
- Strong association with prior use of progesterone-like drugs
- Increased estrogen and progesterone exposure, directly associated with age at spay (known as "ovariohysterectomy")
- Cellular and genetic changes (including amplification of cyclin-A, p53 aberrations and reduced E-cadherin expression) have been implicated

RISK FACTORS
- Intact females have a sevenfold higher risk than do spayed females to develop breast tumors
- Genetic—Siamese
- Administration of progesterone-like drugs (such as megestrol acetate) to treat other conditions—associated with development of benign and cancerous masses
- Age at time of spay (ovariohysterectomy)—cats spayed prior to six months of age and cats spayed after six months, but prior to one year of age, had only 9% and 14%, respectively, of the risk of breast cancer (known as "mammary carcinoma") development compared with intact cats

TREATMENT

HEALTH CARE
- Discharge after surgery, if stable
- Supportive fluids and appropriate antibiotics, as needed

SURGERY
- Radical mastectomy—patients without evidence of spread of the cancer (known as "metastasis") on X-rays, regardless of tumor size; removal of all four glands of the affected chain significantly reduces the chance of local recurrence; include the

lymph nodes (if large or if cancer involvement is suspected) on the same side of the body—lymph nodes are found under the front leg ("axillary lymph nodes") and at the area between the rear leg and the body ("inguinal lymph nodes")
- Tumors in both mammary chains—perform two radical mastectomies, timed usually 2 to 4 weeks apart
- Survival time may be increased with bilateral radical mastectomy
- Spay (ovariohysterectomy) may be performed at the same time as the mastectomy in intact female cats—may address ovarian and uterine disease

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.

- Combination chemotherapy—doxorubicin and cyclophosphamide; repeat every 3 to 4 weeks; shown to induce short-term partial and complete responses in about half of patients with spread of the cancer (metastatic cancer) or with tumors that cannot be removed surgically (known as "nonresectable" disease)
- Other chemotherapeutic agents (carboplatin, mitoxantrone) may have activity
- Mitoxantrone—may substitute for doxorubicin
- No available biological response modifier has shown efficacy

FOLLOW-UP CARE

PATIENT MONITORING

- Complete physical examination—every two months; emphasis on checking previous incision line(s), remaining mammary glands, and axillary and inguinal lymph-node areas
- Chest X-rays—every 1 to 3 months

PREVENTIONS AND AVOIDANCE

- Spay (ovariohysterectomy)—cats had a 91% reduction in the risk of developing breast cancer (mammary carcinoma), if spayed prior to 6 months of age

POSSIBLE COMPLICATIONS

- Tumor—low red-blood cell count (known as "anemia"); reduced bone mass (known as "osteoporosis"); increased calcium levels in the blood (known as "hypercalcemia"); a blood-clotting disorder (known as disseminated intravascular coagulopathy" or "DIC"); fluid build-up in the abdomen (known as "ascites"); fluid build-up in the space between the lungs and chest wall (known as "pleural effusion")
- Chemotherapy—heart condition characterized by flabby heart muscle (known as "dilated cardiomyopathy"); reduction of bone-marrow activity (known as "myelosuppression"), resulting in low numbers of red-blood cells, white-blood cells, and/or platelets; lack of appetite (known as "anorexia"); gastrointestinal toxicity; kidney insufficiency; liver disease (known as "hepatopathy"); chemotherapeutic agents themselves may be carcinogenic (capable of causing cancer) and mutagenic (capable of causing mutations in genes)

EXPECTED COURSE AND PROGNOSIS

- High incidence of recurrence (66% with conservative surgery) and spread of cancer (metastasis)
- Time to recurrence—related to the type of surgery; radical mastectomy disease-free interval, 575 days (survival, 800 days); conservative surgery disease-free interval, 325 days (survival, 500 days)
- Single most important prognostic factor—tumor size; median survival with tumor diameter greater than 3 cm, 6 months after surgery; median survival with diameter less than 2 cm, approximately 3 years
- Five doses of doxorubicin following surgery resulted in longer median disease-free interval (442 days) compared to cats that received fewer doses (104 days)
- HER-2 overexpression has been correlated with poor prognosis, similar to breast cancer in people

KEY POINTS

- Early detection and surgical removal of breast (mammary gland) tumors in cats is very important
- Many patients have advanced disease when first presented for examination by the veterinarian—average of 5 months after the tumors are first noticed
- Spay (ovariohysterectomy) at an early age (prior to 6 months) has a significant protective effect