

## FELINE MAMMARY TUMORS

|   |  |
|---|--|
| <p><b>Description and Clinical Findings</b></p> <p><i>NC State University</i></p> <p><i>Merck Veterinary Manual</i></p> | <p><b>What Are Mammary Tumors? (NC State University)</b><br/>                 A mammary tumor is a tumor of the mammary gland.</p> <ul style="list-style-type: none"> <li>• Cats have four pairs of mammary glands along their underside, starting with glands near the axillary (armpit) region and extending backward to the glands in the inguinal (groin) area.</li> <li>• A set of four glands along the body’s left or right side is called a mammary chain.</li> <li>• 85% of feline mammary tumors are malignant, meaning they have the potential to spread throughout the body. These are the most concerning tumors cats develop.</li> <li>• There are several different kinds of malignant mammary tumors.                         <ul style="list-style-type: none"> <li>○ Cats often develop more than one malignant tumor type in different glands.</li> <li>○ Benign tumors, which are tumors that do not have the potential to spread, are uncommon.</li> </ul> </li> <li>• Un-spayed cats have a seven-fold higher risk of developing mammary cancer than spayed cats.</li> <li>• Male cats can also develop mammary tumors.</li> </ul> <p><b>Clinical Findings of Mammary Tumors in Cats (Merck Veterinary Manual)</b><br/>                 Cats have 4 pairs of mammary glands, with some reports suggesting that mammary tumors affect the caudal mammary glands more commonly, although this has not been definitively established.</p> <ul style="list-style-type: none"> <li>• It is not uncommon for cats to develop multiple mammary tumors, so all mammary glands should be carefully palpated in cats with mammary masses or with a history of mammary tumors .</li> <li>• Mammary masses are located in the subcutaneous tissues within or around mammary glands.                         <ul style="list-style-type: none"> <li>○ Mammary tumors are typically firm and variably sized, ranging from very small mobile nodules to larger fixed, ulcerated masses.</li> <li>○ The local/sentinel lymph nodes—which are usually the axillary and inguinal lymph nodes, depending on the location of the primary mammary mass—may be enlarged.</li> </ul> </li> <li>• Mildly enlarged or normal-sized lymph nodes, which are often not palpable in cats, do not rule out metastatic disease.</li> <li>• Cats can otherwise be clinically normal even with advanced disease, with almost 50% of cats with distant metastasis from mammary tumors showing no clinical signs of illness.</li> </ul> |
| <p><b>Causes</b></p> <p><i>PetMD</i></p> <p><i>VCA Animal Hospital</i></p>  | <p><b>Causes of Cat Mammary Gland Tumors (PetMD)</b><br/>                 The reason why a particular cat may get a mammary gland tumor is not entirely understood.</p> <p>Some cats have a genetic predisposition to develop cancer.</p> <ul style="list-style-type: none"> <li>• The risk of cancer also increases with age and exposure to carcinogens, which are cancer-causing agents like pesticides.</li> <li>• While we aren’t always able to fully control our cat’s environment and genetics, we can control the largest single factor that increases our cat’s risk of developing mammary tumors. That factor is exposure to the sex hormone estrogen.</li> <li>• Early spaying reduces your cat’s exposure to hormones such as estrogen and progesterone. Too many of these hormones can cause the abnormal growth of mammary tumors in cats.</li> </ul>   |

|  |   |
|--|---|
| <p><b>Causes</b></p> <p><i>Continued</i></p> <p><i>PetMD</i></p> <p><i>VCA Animal Hospital</i></p>     | <p><b>What causes this cancer? (VCA Animal Hospital)</b></p> <p>The exact causes for the development of mammary tumors in cats are not fully understood. However, exposure to the female reproductive hormones estrogen and progesterone increases the risk for mammary cancers in cats.</p> <ul style="list-style-type: none"> <li>• It is hypothesized that, under the influence of hormones, the cells of the mammary gland enlarge, progress to a pre-cancerous state, and continue to grow until they transform into a carcinoma. <ul style="list-style-type: none"> <li>○ The incidence of these tumors is related to hormone status, specifically whether a cat is intact or has had an ovariohysterectomy (has been spayed).</li> <li>○ Sexually intact cats have a seven-fold increased risk for mammary tumors compared to spayed cats.</li> <li>○ Early spaying helps to prevent the development of these tumors. Cats that are spayed before six months of age have only a 9% percent risk of developing mammary tumors, whereas the risk increases to 14% in cats spayed between seven and 12 months. Male cats rarely develop mammary tumors.</li> </ul> </li> <li>• Age and breed also play a role in tumor development. Mammary cancers are seen mainly in middle-aged to older cats (around 10-12 years of age).</li> <li>• Siamese and Persian cats appear to be predisposed and are typically younger when diagnosed.</li> <li>• Obesity may play a role in tumor development as well.</li> </ul>  |
| <p><b>Signs / Symptoms</b></p> <p><i>NC State University</i></p> <p><i>Merck Veterinary Manual</i></p> | <p><b>What Are The Clinical Signs? (NC State University)</b></p> <p>Many cats show no signs related to a mammary tumor.</p> <ul style="list-style-type: none"> <li>• You might feel a lump while petting your cat, or a groomer may notice a mass.</li> <li>• Your veterinarian may also discover a mass during an exam.</li> <li>• Some tumors can be ulcerated or bleed. <ul style="list-style-type: none"> <li>○ Cats may lick the affected gland(s).</li> </ul> </li> <li>• If cancer spreads (metastasizes), cats can show weight loss, poor appetite, vomiting, diarrhea, or breathing difficulties.</li> </ul> <p><b>Clinical Findings of Mammary Tumors in Cats (Merck Veterinary Manual)</b></p> <p>Cats have 4 pairs of mammary glands, with some reports suggesting that mammary tumors affect the caudal mammary glands more commonly, although this has not been definitively established.</p> <ul style="list-style-type: none"> <li>• It is not uncommon for cats to develop multiple mammary tumors, so all mammary glands should be carefully palpated in cats with mammary masses or with a history of mammary tumors .</li> <li>• Mammary masses are located in the subcutaneous tissues within or around mammary glands.</li> <li>• Mammary tumors are typically firm and variably sized, ranging from very small mobile nodules to larger fixed, ulcerated masses.</li> <li>• The local/sentinel lymph nodes—which are usually the axillary and inguinal lymph nodes, depending on the location of the primary mammary mass—may be enlarged. <ul style="list-style-type: none"> <li>○ Mildly enlarged or normal-sized lymph nodes, which are often not palpable in cats, do not rule out metastatic disease.</li> </ul> </li> <li>• Cats can otherwise be clinically normal even with advanced disease, with almost 50% of cats with distant metastasis from mammary tumors showing no clinical signs of illness.</li> </ul> |

|  |   |
|--|---|
| <p><b>Diagnosis</b></p> <p>VCA</p>                   | <p><b>How is this type of tumor diagnosed?</b></p> <p>These tumors are typically found as either singular or multiple nodules along your cat's abdomen during a physical exam. Other procedures are then performed to determine the type of tumor and whether it is benign or malignant.</p> <ul style="list-style-type: none"> <li>• A common procedure to diagnose this tumor is a fine needle aspiration (FNA). <ul style="list-style-type: none"> <li>○ FNA involves taking a small needle with a syringe to suction a sample of cells directly from the tumor and place them on a microscope slide.</li> <li>○ A veterinary pathologist then examines the slide under a microscope.</li> </ul> </li> <li>• In some cases, results from FNA may not be entirely clear and removal of the entire tumor may be necessary. <ul style="list-style-type: none"> <li>○ Pieces of the tumor are then examined by a veterinary pathologist under a microscope. This is called histopathology.</li> <li>○ Histopathology is not only helpful in making a diagnosis but can also indicate whether it is benign or malignant and how the tumor is likely to behave.</li> </ul> </li> <li>• Given the risk of metastasis with malignant mammary tumors, your veterinarian may also recommend staging (searching for potential spread to other locations in the body).</li> <li>• This may include blood work, urinalysis, radiographs (X-rays) of the lungs, and possibly an abdominal ultrasound and CT.</li> <li>• Lymph nodes associated with the mammary glands may be sampled by FNA, even if they seem normal.</li> </ul>   |
| <p><b>Staging</b></p> <p>Merck Veterinary Manual</p> | <p><b>Staging</b></p> <p>Full staging is recommended before any treatment, given that most feline mammary tumors are malignant and stage of disease substantially impacts both treatment and prognosis.</p> <ul style="list-style-type: none"> <li>• In addition, staging allows screening for concurrent diseases that might influence not only prognosis, but also the degree to which treatment will be tolerated.</li> <li>• The staging system most commonly applied to cats with mammary tumors is adapted from the WHO staging system.</li> <li>• Stage advances as the size of the primary tumor increases, from &lt; 2 cm (stage I), to 2–3 cm (stage II), to &gt; 3 cm (stage III).</li> <li>• Regardless of tumor size, lymph node involvement also represents stage III disease, and distant metastasis constitutes stage IV disease. Evaluation of the primary tumor's diameter is very helpful in establishing prognosis because larger tumors (&gt; 3-cm diameter) carry a worse prognosis than smaller tumors.</li> </ul> <p><b>Staging of Feline Mammary Tumors</b></p> <p>The staging process should include hematologic and biochemical testing, as well as urinalysis, because most cats with mammary tumors are elderly and may have concurrent disease.</p> <ul style="list-style-type: none"> <li>• The local/sentinel lymph nodes and the lungs are the most common sites for metastasis, although abdominal organs and other lymph nodes can also be affected.</li> <li>• As such, imaging is a crucial part of staging and should include both thoracic and abdominal imaging (typically thoracic radiography or CT and abdominal ultrasonography).</li> <li>• Fine-needle aspirates of local lymph nodes should also be performed because normal-sized lymph nodes do not exclude metastatic disease.</li> <li>• If local lymph nodes cannot be palpated, ultrasonography can be used to direct fine-needle aspiration.</li> </ul> |

## Treatment

NC State University

### What Are The Treatment Options?

#### Surgery

Wide surgical resection is recommended for malignant mammary masses.

- Because mammary tumors are more likely to be aggressive in cats, and they tend to develop more than one tumor, we recommend removing all four glands on the same side as the tumor rather than just the lump. This is called a radical full-chain mastectomy.
- The most aggressive plan is to remove all the mammary tissue on both sides, even if there is only one tumor present on one side. This is called a bilateral radical mastectomy.
- Surgery is done on one side, followed by a recovery period of 2-3 weeks, then surgery is done on the other side.
- Pain medications are essential after surgery.
- We still recommend removing benign tumors, but the surgery can be less aggressive.

#### Radiation Therapy

Radiation therapy has not been studied for treating mammary tumors in cats despite playing a significant role in treating this disease in people.

- Radiation can be done before or after surgery or in cases where the tumor is inoperable.

#### Chemotherapy

Chemotherapy is usually recommended for cats with malignant mammary tumors.

- Protocols vary but typically involve injectable doxorubicin or mitoxantrone either alone or in combination with one or more drugs (carboplatin, cyclophosphamide, others.)
- The goal of this form of chemotherapy is to kill any microscopic cancer cells present after surgery.
- Chemotherapy can be used to treat tumors that cannot be removed with surgery or for cats where surgery is not an option due to other health concerns.
- An alternative to these injections is metronomic chemotherapy, which entails low-dose oral chemotherapy given at home.
  - This treatment plan aims to starve the tumor cells of their blood supply and stimulate the cat's immune system to fight the cancer cells.

#### Non-steroidal anti-inflammatory Drugs (NSAIDs)

NSAIDs play a role in treating many different types of tumors.

- Some cats with mammary carcinoma benefit from receiving an NSAID.
- Bloodwork to monitor kidney function is required.

## References

**Merck Veterinary Manual (Professional Version) - Mammary Tumors in Cats**

By Mariana Lopes, DVM MSc MVM DipECVIM-CA(Oncology) MRCVS, Small Animal Hospital, School of Biodiversity, One Health and Veterinary Medicine, University of Glasgow

Reviewed By Joyce Carnevale, DVM, DABVP, College of Veterinary Medicine, Iowa State University; Reviewed/Revised Sept 2024

[https://www.merckvetmanual.com/reproductive-system/mammary-tumors-in-cats/mammary-tumors-in-cats?query=mammary%20tumors%20in%20cats#Prognosis\\_v93334367](https://www.merckvetmanual.com/reproductive-system/mammary-tumors-in-cats/mammary-tumors-in-cats?query=mammary%20tumors%20in%20cats#Prognosis_v93334367)

**NC State University (Veterinary Hospital) - Medical Oncology: Feline Mammary Tumors**

<https://hospital.cvm.ncsu.edu/services/small-animals/cancer-oncology/oncology/medical-oncology-feline-mammary-tumors/>

**PetMD by Chewy - Cat Mammary Gland Tumors**

By Laci Schaible, DVM, MSL, CVJ; Published Oct. 20, 2021

[https://www.petmd.com/cat/conditions/cancer/c\\_ct\\_mammary\\_gland\\_tumor](https://www.petmd.com/cat/conditions/cancer/c_ct_mammary_gland_tumor)

**VCA Animal Hospital - Mammary Tumors in Cats**

By Malcolm Weir, DVM, MSc, MPH; Debbie Stoewen DVM, MSW, RSW, PhD; Christopher Pinard, DVM, DVSc, DACVIM (Oncology)

<https://vcahospitals.com/know-your-pet/mammary-tumors-in-cats>