

**MAMMARY TUMORS**

<p>Description</p> <p><b>Mammary Tumors</b>  <i>NC State University – Veterinary Hospital</i></p>	<p><b>Mammary Tumors</b> (<i>NC State University – Veterinary Hospital</i>)</p> <p>Dogs have five pairs of mammary glands, starting with glands near the axillary (armpit) region, extending backwards to the glands located in the inguinal (groin) area. A set of five glands along either the left or right side of the body is called a mammary chain.</p> <p>A mammary tumor is a tumor of the mammary tissue.</p> <ul style="list-style-type: none"> <li>• They are common in un-spayed dogs and dogs spayed after their first heat cycle.</li> <li>• Mammary tumors occur more frequently in breeds such as <i>toy and miniature poodles, spaniels and German shepherds</i>.</li> <li>• Male dogs are rarely affected.</li> </ul> <p>Mammary tumors vary in size, shape and consistency. They can be movable or attached to underlying tissue. Some dogs develop a single tumor in one gland while others develop multiple tumors in different glands or even within the same gland.</p> <p>Mammary tumors are either <i>malignant</i> (cancerous) or <i>benign</i> (non-cancerous).</p> <ul style="list-style-type: none"> <li>• The most common tumors are adenomas (benign), carcinomas (malignant) and adenocarcinomas (malignant).</li> <li>• Dogs can have malignant and benign tumors at the same time or have a history of a benign tumor and then develop a malignant one (and vice versa.) (<i>NC State University – Veterinary Hospital</i>)</li> </ul>
<p>Breeds at Risk</p> <p><b>Breeds</b>  <i>VCA Animal Hospital</i></p>	<p><b>Breeds</b> (<i>VCA Animal Hospital</i>)</p> <p>Certain breeds appear to be more commonly affected, including:</p> <ul style="list-style-type: none"> <li>• Boxers</li> <li>• Brittany Spaniels</li> <li>• Chihuahuas</li> <li>• Cocker Spaniels</li> <li>• Dachshunds</li> <li>• Doberman Pinchers.</li> <li>• English Setters</li> <li>• Poodles</li> <li>• Yorkshire Terriers</li> </ul> <p>Other articles show mammary tumors in other breeds such as:</p> <ul style="list-style-type: none"> <li>• English Springer Spaniel</li> <li>• German Shepherds</li> <li>• Maltese</li> <li>• Pointers (<i>VCA Animal Hospital</i>)</li> </ul>
<p>Risks - Genetic and Environmental</p> <p><b>What causes this cancer?</b>  <i>VCA Animal Hospital</i></p>	<p><b>What causes this cancer?</b> (<i>VCA Animal Hospital</i>)</p> <p>The exact causes of mammary tumors in dogs are not fully understood. It is well known that exposure to specific hormones, namely progesterone, increases the risk of developing mammary cancers in dogs, because progesterone stimulates growth factors (molecules that stimulate specific processes in the body) that cause mammary cells to multiply.</p> <p>Research in veterinary medicine continues but, to date, we still know little about which genes and mutations can lead to the development of mammary tumors in dogs.</p> <ul style="list-style-type: none"> <li>• In human medicine, research has established a definite relationship between the BRCA gene (breast cancer gene) and the development of breast cancer.</li> <li>• Research is ongoing, but there may be a link between mammary tumors and similar genes in dogs. (<i>VCA Animal Hospital</i>)</li> </ul>

<p>Spaying</p> <p><b>Mammary cancer in female dogs</b> Cornell University</p>	<p><b>Mammary cancer in female dogs</b> (Cornell University)</p> <p><b>About half of the tumors are malignant:</b></p> <ul style="list-style-type: none"> <li>• Mammary tumors in female dogs account for 42% of all diagnosed tumors, with a lifetime risk of 23-34%, according to the Veterinary Society of Surgical Oncology (VSSO).             <ul style="list-style-type: none"> <li>○ Compare that to women, who have a 12.4% lifetime risk according to Susan G. Komen, an American breast cancer organization. It’s sobering.</li> </ul> </li> <li>• “At a cellular level, mammary tumors in dogs and cats are very similar to human breast cancer tumors,” says Dr. Scott Coonrod, the Judy Wilpon Professor of Cancer Biology and director of the Baker Institute for Animal Health. <i>“And they may occur in pets even more often than they do in humans.”</i></li> <li>• That’s because intact (un-spayed) female dogs have fully developed mammary tissue.             <ul style="list-style-type: none"> <li>○ A dog spayed prior to sexual maturity (around 6 months old) is at a reduced risk of mammary cancer because the spay removes the ovaries, which produce the estrogen that is significant to the full development of the mammary glands.</li> </ul> </li> </ul> <p>According to the American College of Veterinary Surgeons, the risk of your dog getting mammary cancer is:</p> <ul style="list-style-type: none"> <li>• 0.5% risk for female dogs spayed before their first heat cycle</li> <li>• 8% risk for female dogs spayed after their first heat</li> <li>• 26% risk for female dogs spayed after their second heat</li> <li>• Additionally, 50% of mammary tumors are malignant</li> </ul> <p>Obesity, especially at a young age, as well as breed, may also influence the risk. (Cornell University)</p>
<p>Symptoms</p> <p><b>Detection and Diagnosis</b> Cornell University</p> <p><b>What are the clinical signs?</b> NC State University – Veterinary Hospital</p>	<p><b>Detection and diagnosis</b> (Cornell University)</p> <p>Tumors usually are found by owners who feel a lump. Other symptoms include:</p> <ul style="list-style-type: none"> <li>• Swollen glands</li> <li>• Painful abdomen</li> <li>• Discharge from one or more glands</li> <li>• Ulceration of the skin on the abdomen</li> <li>• Lethargy</li> </ul> <p>Weight loss (at later stages) (Cornell University)</p> <p><b>What are the clinical signs?</b> (NC State University – Veterinary Hospital)</p> <ul style="list-style-type: none"> <li>• Many dogs show no signs related to a mammary tumor. You may feel a lump while petting your dog or your groomer may notice a mass. Your veterinarian may also discover a mass during a routine exam.</li> <li>• In more advanced cases, tumors can be ulcerated or bleed. Dogs may lick at the affected gland(s).</li> <li>• If the tumor spreads (metastasizes), dogs can show weight loss, poor appetite, vomiting, diarrhea and/or breathing difficulties.</li> <li>• Inflammatory mammary carcinoma is a specific type of malignant mammary tumor.             <ul style="list-style-type: none"> <li>○ Dogs have severe swelling, redness and pain of the gland with the tumor.</li> <li>○ This can extend throughout the entire mammary chain on the affected side or can affect both mammary chains at the same time. (NC State)</li> </ul> </li> </ul>

<p>Testing</p> <p><b>Diagnosics</b> ACVS</p>	<p><b>Diagnosics (ACVS)</b> A good general physical exam is needed to find the location, size, and character of all the mammary masses and assess local lymph node enlargement. Other procedures are performed to stage the cancer (determine what type it is and where it is located in the body):</p> <ul style="list-style-type: none"> <li>• Bloodwork: blood count, chemistry, urinalysis, and clotting profile</li> <li>• Abdominal ultrasound, chest x-rays and sometimes CT scan: used to check for cancer that has spread to other parts of the body</li> <li>• Aspiration (aka Fine Needle Aspirate): a needle is used to sample the mammary mass to help distinguish it from other skin tumors.</li> <li>• Lymph nodes may also be assessed to look for a spread of cancer cells. This is more reliable in dogs than cats to confirm a diagnosis.</li> <li>• A biopsy may be indicated to rule out a certain kind of tumor called inflammatory mammary carcinoma, as surgery is generally not recommended for this tumor type. (ACVS)</li> </ul>
<p>Treatment</p> <p><b>Treatment options available and prognosis</b> NC State University – Veterinary Hospital</p> <p><b>Surgery</b> ACVS</p>	<p><b>Treatment options available and prognosis (NC State University – Veterinary Hospital)</b></p> <p><b>Surgery</b></p> <ul style="list-style-type: none"> <li>• Wide surgical resection is recommended for malignant mammary masses.</li> <li>• Benign tumors require less aggressive surgical margins.</li> <li>• Surgery is the only treatment required for benign tumors and some malignant tumors.</li> <li>• Dogs with large tumors, high-grade tumors, tumors that have already spread, and certain histological types are at higher risk for regrowth and spread following surgery.</li> <li>• Multiple tumors can be removed at the same time.             <ul style="list-style-type: none"> <li>○ Each tumor should be submitted for biopsy because they can all be different. (NC State University – Veterinary Hospital)</li> </ul> </li> </ul> <p>Dogs spayed at the time, or within 2 years, of tumor removal lived longer than un-spayed dogs in one study.</p> <p><b>Radiation Therapy</b></p> <ul style="list-style-type: none"> <li>• Radiation therapy (RT) has not been investigated for the treatment of mammary tumors in dogs, despite playing a big role in the treatment of this disease in people.</li> <li>• Possible uses include pre-operative irradiation of large tumors, post-operative irradiation of incompletely resected tumors, or palliative irradiation of inoperable tumors.</li> <li>• Dogs with <i>inflammatory mammary carcinoma</i> may benefit from radiation therapy.</li> </ul> <p><b>Chemotherapy</b></p> <ul style="list-style-type: none"> <li>• The role of chemotherapy for dogs with malignant mammary tumors is not well-established. Chemotherapy is recommended for dogs with higher risk of metastasis or tumors that already metastasized.</li> </ul> <p><b>Non-Steroidal Anti-Inflammatory Drugs (NSAIDs)</b></p> <ul style="list-style-type: none"> <li>• NSAIDs play a role in treating many different types of carcinomas. Dogs with mammary carcinoma can benefit from receiving an NSAID.</li> </ul> <p><b>Prognosis</b></p> <p>The prognosis for dogs with benign tumors is <i>excellent</i>.</p> <ul style="list-style-type: none"> <li>• About half of the dogs with malignant tumors also have an excellent prognosis with surgery alone.</li> <li>• The remaining 50% of dogs with malignant tumors are at risk for the spread of their tumor. This leads to illness and poor quality of life, with survival times usually less than one year.</li> </ul> <p>Dogs with inflammatory <i>mammary carcinoma</i> and <i>mammary sarcomas</i> have a <i>poor</i> prognosis, on the order of weeks to months. (NC State)</p>

	<p><b>Surgery and Spaying: (ACVS)</b>          Further consultation with your primary care veterinarian may result in a referral to an ACVS board-certified veterinary surgeon to fully explore your options.</p> <ul style="list-style-type: none"> <li>• The type of surgery depends on the size, location, and number of mammary tumors and species of your pet.             <ul style="list-style-type: none"> <li>○ In general, surgery is more conservative for dogs with mammary tumors and involves removal of either the mass alone or the affected mammary gland.</li> <li>○ <i>However, in <b>cats</b>, more aggressive surgery is recommended with removal of one or preferably both sets of mammary glands. Surgery to remove both sets of mammary glands from a cat is often done in two surgical procedures 2–3 weeks apart. The local lymph node should also be removed in cats, if possible, to assess for evidence of spread of the cancer.</i></li> </ul> </li> <li>• The role of spaying female dogs with mammary tumors is controversial. Most studies have shown no beneficial effect of spaying at the time of tumor removal in preventing the development of new mammary tumors or influencing the aggressiveness or metastatic potential of existing mammary tumors.             <ul style="list-style-type: none"> <li>○ However, spaying at the time of mammary tumor resection may be recommended by your veterinary surgeon because recent studies have shown a beneficial effect in dogs with mammary tumors, and it can prevent unrelated diseases, such as pyometra (uterine infection). (ACVS)</li> </ul> </li> </ul>
<p>References</p>	<p>ACVS American College of Veterinary Surgery- Mammary Tumors  <a href="https://www.acvs.org/small-animal/mammary-tumors/">https://www.acvs.org/small-animal/mammary-tumors/</a></p> <p>Cornell University, College of Veterinary Medicine - Mammary Cancer          Cornell Richard P. Riney Canine Health Center  <a href="https://www.vet.cornell.edu/departments-centers-and-institutes/riney-canine-health-center/canine-health-information/mammary-cancer">https://www.vet.cornell.edu/departments-centers-and-institutes/riney-canine-health-center/canine-health-information/mammary-cancer</a></p> <p>Merck/MDS - Mammary Tumors in Dogs  <i>By Karin Sorenmo, DVM, Reviewed/Revised Mar 2024</i>  <a href="https://www.msdrvmanual.com/reproductive-system/mammary-tumors-in-dogs/mammary-tumors-in-dogs#Prevention_v88234824">https://www.msdrvmanual.com/reproductive-system/mammary-tumors-in-dogs/mammary-tumors-in-dogs#Prevention_v88234824</a></p> <p>NC State University – Veterinary Hospital          Medical Oncology: Canine Mammary Tumors  <a href="https://hospital.cvm.ncsu.edu/services/small-animals/cancer-oncology/oncology/canine-mammary-tumors/">https://hospital.cvm.ncsu.edu/services/small-animals/cancer-oncology/oncology/canine-mammary-tumors/</a></p> <p>VCA Animal Hospital - Malignant Mammary Tumors in Dogs          By Malcolm Weir, DVM, MSc, MPH; Debbie Stoewen DVM, MSW, RSW, PhD; Christopher Pinard, DVM  <a href="https://vcahospitals.com/know-your-pet/mammary-tumors-in-dogs-malignant">https://vcahospitals.com/know-your-pet/mammary-tumors-in-dogs-malignant</a></p>