

## BASIC INFORMATION

### Description

Mammary gland tumors are benign or malignant masses that develop in breast tissue. They usually affect older, female dogs. They are the most common tumors found in the female. These tumors usually occur in intact (unspayed) females or in dogs that were spayed later in life.

### Causes

Since half of all mammary tumors contain hormone receptors, their development may be linked to estrogen or progesterone hormones. Dogs given progesterone to prevent heat cycles are at a greater risk of developing mammary tumors.

The risk of developing mammary tumors is directly related to the number of heat cycles the dog has experienced. If the dog is spayed before the first heat cycle, the risk is as low as 0.05%. Relative risk increases to 8% after one heat cycle and to 26% after a second heat cycle.

### Clinical Signs

A swelling develops in one or more mammary glands or in adjacent tissue. The mammary glands closest to the rear legs are most commonly affected. The number, size, and shape vary depending on the time of diagnosis. Some benign masses are only found when the dog is petted or during routine physical examinations.

Mammary masses that are severely inflamed and ulcerated or that cause a fever may resemble mastitis and are probably malignant (cancerous). With very advanced tumors, clotting disorders can develop, with bleeding from the gums, skin, vulva, or other superficial surfaces. Occasionally, lameness can occur if the tumor has spread to a bone.

### Diagnostic Tests

Laboratory tests may be normal but are often recommended prior to biopsy or surgery. X-rays of the lungs and an ultrasound may be recommended to check for spread of the tumor, especially if a malignancy is suspected. X-rays or a specialized bone scan can be done to determine whether the tumor has spread to bone.

Aspiration of the mass with a fine needle often helps identify whether the tumor is benign or malignant. Similar aspirations of nearby lymph nodes (glands) may help to detect metastasis. If it is uncertain that the mass is really a tumor, small pieces may be removed for analysis by a pathologist. For small, well-defined tumors, your veterinarian may recommend proceeding directly to surgery to remove the mass, with subsequent submission of the tissue to a pathologist.

## TREATMENT AND FOLLOW-UP

### Treatment Options

A number of surgical procedures are available for treating these tumors. They range from a simple lumpectomy to a radical chain mastectomy (removal of all glands on one side), depending on the characteristics of the tumor and how many glands are involved.

- Lumpectomies are usually limited to small, well-defined nodules.
- Removal of one entire gland may be done when a single tumor is located in the center of the gland.
- A partial mastectomy (removal of 1-3 glands) or chain mastectomy is done when multiple glands are affected on one side.
- Removing both chains of mammary glands during the same surgery is not usually recommended, because it is difficult to get adequate closure of the surgical wounds and the procedure is hard on the dog.
- No particular surgical procedure is more effective than others, so the technique chosen is usually based on the clinical findings in each dog.

Removal of the ovaries (assuming the bitch is still intact) has not been proven to alter the prognosis following surgery; however, the remaining mammary tissues will usually shrink somewhat, which makes it easier for the owner and veterinarian to detect new tumors. Radiation therapy and chemotherapy have not been very effective for treatment of mammary tumors in dogs.

### Follow-up Care

Most dogs do well following surgery for mammary tumors but may require hospitalization for a few days. In some cases, drains are inserted for a few days, and bandaging is required for some dogs. Periodic laboratory tests and x-rays may be done to monitor for metastasis if the tumor was malignant.

### Prognosis

For benign mammary tumors, prognosis is good following surgery. Dogs with malignant tumors less than 1.5 inches (3 cm) in diameter have a better prognosis following surgery than those with larger tumors.

The presence of multiple tumors does not seem to affect prognosis. Survival for longer than 2 years may be possible with some low-grade cancers. Tumors that are large and invade deep tissues have a poor prognosis because of their higher potential for metastasis. Dogs that have been spayed prior to developing a mammary tumor have a better prognosis with some types of carcinomas than unspayed dogs.