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Dog Tips

Malignant Mast Cell Tumor Resolves with 1 Simple Therapy

Often found on the trunk, limbs and between the toes of many popular breeds of dogs, these tumors can spread and recur after surgery. With his owner rejecting surgery, chemo and radiation, this 7-year-old canine patient lived to age 15 with no recurrence after this one therapy.

Reviewed by Dr. Becker

STORY AT-A-GLANCE

- Researchers at Boston College, including one of the leading pioneer academic researchers in treating cancer as a metabolic disease, published a case report of a dog with malignant mast cell tumor disease whose cancer completely resolved with ketogenic metabolic therapy alone
- When mast cells, which are found in all the tissues of the body, replicate in abnormally high numbers, a mast cell tumor can be the result; in dogs, prognosis depends on the tumor location, the extent and grade of the tumor, and the type of treatment given
- The 7-year-old dog presented in the Boston College case report was switched to a calorie restricted, carbohydrate-free, raw ketogenic diet two years after diagnosis; over several months, the tumor gradually disappeared; the dog lived to age 15 and passed away from other causes
- Calorie restriction and restricted ketogenic diets have successfully reduced growth and metastasis in a range of malignant tumors in mice and humans; however, in none of those cases was resolution of the tumor achieved with diet alone, as in this case
- Integrative and holistic veterinarians can offer many additional complementary, nontoxic therapies for pets diagnosed with mast cell tumors

Editor's Note: This article is a reprint. It was originally published August 4, 2023.

A team of researchers in the Department of Biology at Boston College published a very encouraging study just a few months ago describing the case of a dog with malignant mast cell tumor (MCT) disease whose cancer completely resolved with ketogenic metabolic therapy alone.[1] According to the study authors, ketogenic metabolic therapy (KMT) is emerging as a nontoxic nutritional intervention for cancer management in animals and humans alike.

Among the study authors was, Dr. Thomas Seyfried, one of the leading pioneer academic researchers in treating cancer as a metabolic disease. He's been teaching neurogenetics and neurochemistry as it relates to cancer treatment at Yale University and Boston College for 30 years.

Mast Cell Tumors

Mast cells exist in all the tissues of the body but are found in the highest concentrations in the skin, respiratory tract, and gastrointestinal (GI) tract. Mast cells are very rich in histamine, which is a vasodilator that promotes blood flow to tissues, and heparin, an anticoagulant that prevents blood from clotting too quickly. Both are naturally occurring chemicals that play a role in all allergic responses, nonallergenic skin disease, wound healing, and tissue remodeling. They can also increase stomach acid production.

When mast cells replicate in higher-than-normal numbers, a mast cell tumor can form. Mast cell tumors are quite common, accounting for about 20% of all skin tumors in dogs. If a pet has a mast cell tumor on the skin, there'll be a bump or a lesion of some kind. Sometimes it's a raised pink bump that looks like a pencil eraser on the surface of the skin. It may be ulcerated or scabby or oozing.

Sometimes the tumor will be a less-defined mass that feels like a lump under the skin, similar to a fatty lipoma. Because these tumors can mimic the appearance of many other types of skin problems, it's very important to have your veterinarian check out any new lumps or bumps on your pet.

Dogs usually develop a single tumor, whereas cats can develop multiple tumors, and although some may be benign, most mast cell tumors are cancerous (malignant).

Mast cell tumors can be irritating, so pets will sometimes begin licking, scratching, or picking at them. There can also be complications from the tumors, such as stomach problems from the overproduction of histamine and excessive bleeding from the release of heparin.

Mast Cell Cancer in Dogs

In dogs, mast cell tumors are most often found on the trunk, the limbs and between the toes. The tumors are seen more often in certain breeds, including the Bulldog, Boston Terrier, Boxer, Pug, Labrador and Golden Retriever, Cocker Spaniel, Schnauzer, Staffordshire Terrier, Beagle, Rhodesian Ridgeback, Weimaraner, and the Shar Pei.

Prognosis for dogs depends on the tumor location, the extent of the tumor, the grade, and the type of treatment given. Mast cell tumors of the skin are very different in dogs than in cats. Surgery to remove the tumor is less invasive in cats, and the prognosis for a full recovery is much better in cats than in dogs.

Mast cell tumors with a generally poor prognosis are those on the muscle, in the mouth, in the internal organs, the bloodstream or bone marrow, and ulcerated tumors. Mast cell tumors that cause GI ulceration or are large, fast-growing, or recurring also carry a much poorer prognosis.

Mast cell tumors are typically graded on a scale of I to III in dogs, with grade III being the most serious and carrying the worst prognosis for recovery. Grade I tumors generally have an excellent cure rate, as long as the entire thing is removed. And again, it's important that the surgeon takes very wide margins.

If a dog goes 30 weeks post-surgery for a grade I tumor with no recurrence during that time, he's considered cured. However, even with aggressive surgery, the recurrence rate for a grade II mast cell tumor is about 20%. Most dogs with grade III malignant mast cell tumors will experience spread of the tumor. Sadly, only about 10% of these dogs live longer than a year after surgery.

Study Dog Diagnosed with a Mast Cell Tumor Below the Nose

In the study led by Dr. Seyfried, the patient was Nikaa, a 7-year-old, 60-pound spayed female Pit Bull terrier who was diagnosed in July 2011 with a cutaneous mast cell tumor under the right nostril. The tumor was not graded at that time.

The owner wasn't interested in subjecting Nikaa to standard of care (surgery, chemotherapy, and radiation) and steroid medication (prednisone) due the known potential adverse effects of those treatments. Instead, the dog was switched from Ol' Roy canned dog food to a raw vegetable diet with cooked fish and lentils.

Unfortunately, the tumor continued to grow, reaching about 4 cm in size, and invaded local tissues, which is suggestive of malignancy and the first step in the "metastatic cascade" that ends with the spread of the cancer to one or more distant organs. Since no additional diagnostic testing was done, and the tumor wasn't graded at initial diagnosis, it's not known whether the grade increased.

2 Years Post-Diagnosis, a Raw Keto Diet Is Introduced

At the end of June 2013, the owner switched Nikaa's diet again, this time to a calorie restricted, carbohydrate-free, raw ketogenic diet consisting mostly of chicken and oils. Dietary calories were reduced to 60% of that consumed on the original (Ol' Roy) diet, which amounted to 444 kilocalories every 12 hours, plus one medium-sized raw radish given as a treat between meals. The new diet (which the dog enjoyed, including the raw radish treat) consisted of:

- One organic raw chicken leg with bone (150 Kcal); 26 g fat: 36 g protein
- One organic raw chicken egg (54 Kcal); 1.5 g fat: 6.0 g protein
- One tablespoon (14.3 g) of pure LouAna coconut oil (120 calories); 14.3 g fat: 0 g protein
- Three teaspoons (12.6 g) of grizzly pollock oil for dogs (120 calories); 12.6 g fat: 0 g protein

After several months on the raw ketogenic diet, the tumor gradually disappeared. Nikaa lost about 8% of her body weight, and per the study authors, "maintained an attentive and active behavior according to the parent."

Dog Lives to Age 15 with No Recurrence of Cancer

Nikaa remained on the calorie restricted raw keto diet until 2019, with occasional substitution of cooked vs. raw chicken (not cooked bone) once the tumor was no longer visible. In June of that year, she passed away painlessly in her human's arms at the age of 15. Nikaa died from an enlarged heart — there was no evidence of recurrence of the mast cell tumor below her nose or anywhere else on her body. According to Dr. Seyfried and colleagues:

> *"It is known that overall survival for grade II MCT is about 21.5 months and for grade III MCT is only about 9.2 months (**2**, **25**). This patient survived for 63 months living a normal life span after resolution of the cancer. A timeline of the case is shown in **Figure 2**."*

According to the study's authors, calorie restriction and restricted ketogenic diets have successfully reduced growth and metastasis in a range of malignant tumors in mice and humans. However, in none of those cases was resolution of the tumor achieved with diet alone, as in Nikaa's case.

"The resolution of the MCT in this canine patient should be viewed as anecdotal until further studies are conducted in other canine patients using a therapeutic strategy that is the same or similar to that used on our canine patient," the authors write.

Recommendations for Pets with Mast Cell Tumors

It's best to work with an integrative or holistic veterinarian to reduce the risk of recurrence, because these veterinarians use a variety of additional complementary therapies that can be very beneficial, such as Ayurvedic medicine and Chinese herbs that naturally decrease the number of circulating mast cells in the body.

There are also nutraceuticals and additional supplements that can help naturally reduce mast cell degranulation and histamine release, which keeps the patient much more comfortable.

A healthy diet for your animal companion — one that is anti-inflammatory and not metabolically stressful — consists of real, whole foods, preferably raw. Many of these diets are pasteurized (bacteria-free) or gently cooked. It should include high-quality protein (muscle meat and organs), high amounts of unprocessed fat, EPA, and DHA (omega-3 fatty acids), and low glycemic, brightly colored veggies that provide important antioxidants, fiber and polyphenols not found in meat. The proportions of these macronutrients can be tailored to meet the individual needs of the animal.

The ratio of fat to protein plus carbs in the diet can be altered, depending on how quickly the metabolic state of ketosis is desired. A high ketogenic ratio (4:1) induces ketosis quickly, but research shows it isn't sustainable for more than several months without changes in the microbiome that demonstrate a fiber/roughage deficiency.

According to Dr. Seyfried, most patients do best cycling to a lower ketogenic ratio after 3 months, increasing roughage and protein to avoid muscle loss and microbiome imbalances.

The good news is most well-formulated commercially available raw food diets are naturally ketogenic; many brands having a ketogenic ratio of 1:1. This lower keto ratio allows for more protein and roughage, so it's also sustainable for the microbiome, long term. It's also recommended to still rotate sources of veggies and protein over time, to enhance gut diversity. Keto diets are high in fat, and heat processing damages fat (creating toxic byproducts), so they must be fed raw.

One of the hang-ups of keto diets is assuring the diet is nutritionally balanced to not just meet minimal nutrient requirements, but to include optimal levels of vitamins and minerals coming from real food (including vitamins D, E, A, and zinc and selenium), which means if you are preparing your pet's food at home you need to follow a recipe that ensures nutritional adequacy (this means nutrient information is provided with the recipe, ask your vet to double check if you're not sure if the recipe you're following is balanced — don't guess).

Certain supplements and add-ins can also be very beneficial to enhance immune function, including:

- Sprouts
- Pine bark extract
- Medicinal mushrooms
- Decaf green tea
- Turmeric/curcumin

- Berberine and quercetin

If your pet has been diagnosed with mast cell tumors, it's best that you never vaccinate again. Additional vaccines can prompt a massive inflammatory response that can spur on additional mast cell tumors. From this point forward, if you have a dog or cat diagnosed with mast cell tumors, opt to do a titer instead.

Sources and References

[1] Front. Nutr., March 28, 2023, Sec. Nutrition and Metabolism, Volume 10 - 2023