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VETERINARY ONCOLOGY CONSULTANTS

helping veterinarians treat pets with cancer

April 2005

Causes of Cancer in Dogs

One of the most common questions clients ask their veterinarian is, "What caused my dog or cat's cancer?" The answer to that question is difficult to answer, but as in man, the causes of cancer in canine oncology often involve genetic and environmental risk factors. The prevention of cancer is often based on the identification of at-risk animals based on familial/genetic and environmental influences. Clients should be educated that increased risk may or may not be equated with causality; in other words, exposure to a risk factor may not have *caused* their pet's cancer. These factors should be discussed during consultation.

Genetics: There is little doubt that cancer occurs more often in certain breeds and that environmental factors may influence these factors. German shepherd dogs have been shown to be at risk for bilateral cystadenocarcinomas. Flat-coated retrievers (and Bernese mountain dogs) have been shown to have a high incidence of cancer including malignant histiocytosis. Scottish terriers, especially those with exposure to insecticides, have an increased risk of developing transitional cell carcinomas of the bladder.

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**Angela E Frimberger VMD,
Diplomate ACVIM (Oncology)**

Oncotip

When needle-biopsying a suspected primary bone tumour the site most likely to yield an accurate diagnosis is through the **centre of the radiographic lesion** (in contrast to tumours in other tissues which are normally biopsied near the periphery). This reduces the chance of obtaining reactive bone that surrounds the lesion. Take 3 biopsies. Remember that with amputation and chemotherapy approximately 50% of dogs with osteosarcoma live a year and 25% are cured.



**Antony S Moore BVSc, MVSc,
Diplomate ACVIM (Oncology)**

Newsletter

It's been about 6 months since our previous newsletter, and many of you will be receiving this for the first time. Thank you both to those of you who are still with us, and to those who have started working with us recently.

In this issue we have included an article about the causes of cancer in dogs, as we notice that this is often one of the first questions clients ask us about their pets with cancer. We've also included a "pre-print" abstract from an article just submitted for publication, to give you an idea of what we're up to.

We hope you find this informative and entertaining!

Best regards, Tony and Angela

Veterinary Oncology Consultants' mission is to assist other veterinarians in providing the highest possible quality of life for pets with cancer and their human families, by making evidence- and compassion-based recommendations for their care and providing educational materials.

On the road again...

We both travel a fair amount as part of our work (as well as for holidays). Because we are such a small business we don't yet have coverage available when we are traveling, but we make every effort to minimize the impact on our consulting service. When we're away we continue to monitor faxes, email, and online consultation requests (the form on our website), although it may be difficult for us to receive phone messages; and will respond to inquiries or consultation requests within the shortest possible time.

We will be overseas in the coming months, from 15 April to 15 May.

New Literature

The article abstracted here is not yet in print, but we're obviously excited about it. The first aspect of the findings that is of interest in veterinary oncology, is that longer remission and survival times can be achieved for some dogs with lymphoma, by giving more intense chemotherapy. The second is the fact that this type of treatment is feasible in veterinary medicine.

We are now developing other ways to support chemotherapy dose intensification in a less technically demanding protocol, and thereby hope to still impart the antitumour benefits seen here, with a more accessible approach.

A combination chemotherapy protocol with dose intensification and autologous bone marrow transplant (VELCAP-HDC) for canine lymphoma. *Frimberger AE, Moore AS, Rassnick KM, Cotter SM, O'Sullivan JL, and Quesenberry PJ. Submitted to J Vet Int Med.*

28 dogs with lymphoma were treated with a 12-week, 5-drug chemotherapy protocol based on the previously published VELCAP-S protocol, but concluding with a high dose of cyclophosphamide (CXN) supported by an autologous bone marrow transplant. A dose escalation design was used to determine the maximum tolerated cyclophosphamide dose (MTD) in this setting.

3 CXN dose levels were given:

- 300 & 400 mg/m² IV (groups 1 & 2, 15 dogs),

- 500 mg/m² IV (group 3, 13 dogs).

The MTD was 500 mg/m² IV. Toxicity was common but mild, and the dose-limiting toxicity was neutropenia. One dog in group 3 developed sepsis and responded promptly to routine management. No other dog required hospitalization at any time and no dog died.

Lower stage and higher CXN dose were significantly associated with a longer remission duration (all $p < 0.0001$). Median

remission duration for dogs in group 3 was 54 weeks, compared to 20.6 weeks for dogs in groups 1 and 2. Factors associated with a longer survival time were lower stage ($p=0.042$) and higher CXN dose (both study group and CXN dose) ($p = 0.027$). Median survival time for dogs in group 3 was 138.9 weeks, compared to 43.3 weeks and 68.3 weeks for dogs in groups 1 and 2, respectively.

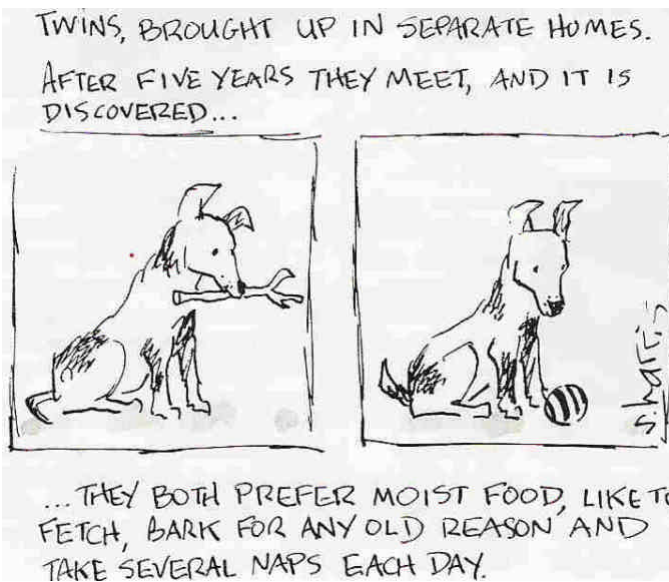
Causes of cancer in dogs, continued

Ovariohysterectomy/Orchiectomy. Ovariohysterectomy has long been demonstrated to be a markedly effective method of preventing mammary tumors when performed before the first estrus. Spaying is moderately effective if performed before the dog is 2.5 years of age. Although not yet confirmed, spaying may also be therapeutic when treating dogs with mammary tumors. Orchiectomy will obviously reduce the risk of testicular tumors. Gonadectomy may not uniformly protect against all cancers. In one study male and female Rottweiler dogs that underwent gonadectomy before 1 year of age were significantly more likely to develop osteosarcoma than dogs that were sexually intact.

Nutrition: A life time study was done with Labrador retriever dogs fed the same food comparing control-fed vs restricted-fed (25% less intake). The median life span of the restricted-fed group was significantly longer. While the prevalence of cancer between groups was similar, the mean age due to cancer related deaths was 2 years later in the dogs that received the restricted diet. Obesity is also a

factor in mammary neoplasia in dogs. In one case-controlled study, the risk of mammary carcinoma among ovariectomized dogs was significantly reduced (by 40%) in dogs that had

environmental tobacco smoke (ETS). In fact, exposure levels in animals kept indoors continuously may be higher than those of human household members, who often spend extended periods of time outside the home. Dogs have been shown to have an increased risk of developing cancer of the respiratory tract when exposed to ETS. For lung cancer, the risk rose for dogs with short or medium length nasal cavities. Dolichocephalic dogs have an increased risk of developing nasal cancer when exposed to ETS than brachycephalic dogs. Mesothelioma is more common in dogs owned by people who worked in the asbestos



been thin at 9 to 12 months of age. Another study showed obesity at 1 year of age almost trebled the incidence of mammary cancer in intact dogs.

Environmental Carcinogens. In sharing their living environment with humans, pets are exposed to many of the same environmental contaminants as their owners, including envi-

ros industry. The use of chemicals by owners, specifically 2,4-D, paints, asbestos or solvents, and exposure to high radiation and electromagnetic fields has been associated with increased risk for canine lymphoma. Application of insecticides (but not in a spot-on formulation) increased the risk of bladder cancer in Scottish terriers in another study.