TEN AMAZING ADVANCES IN ONCOLOGY FOR 2008
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The popularity of oncology is increasing dramatically in veterinary medicine in part because of the many advances in veterinary cancer diagnostics and therapeutics. This is especially true in California where clients and their family veterinarians seek the very best level of care possible that enhances and improves quality of life. The objectives of the following are to recognize ten of the most amazing advances in veterinary oncology.

Cancer Prevention
Cancer can be prevented if the known risk factors are identified. Lifetime obesity is one risk factor. Eicosapentaenoic and docosahexaenoic acids (DHA and EPA) have been shown consistently to inhibit the proliferation of cancer cell lines in vitro and to reduce the risk and progression of these tumors in many species (Am J Epidemiol 141(4):352-359, 1995). Similarly, maintenance of lean body mass in dogs throughout life has been shown to increase their survival and improve quality of life. In fact, maintenance of lifelong lean body mass has been shown to delay the onset of cancer (J Am Vet Med Assoc 220;1315-1320, 2002).

Secret #1: Lifetime weight management is associated with decreased risk of developing cancer and other diseases such as diabetes mellitus. DHA and EPA may reduce the risk of cancer.

Dogs have been shown to have an increased risk of developing cancer of the respiratory tract, especially of the lung and nasal cavity, when exposed to coal and kerosene heaters and passive tobacco smoke. Mesothelioma is more common in dogs owned by people who worked in the asbestos industry. The use of chemicals by owners, specifically 2,4-dichlorophenoxyacetic acid, paints, asbestos or solvents, as well as radiation and electromagnetic field exposure were associated with increased risk for several types of cancer in pet dogs. Application of insecticides (but not in a spot-on formulation) increased the risk of bladder cancer in Scottish terriers in another study (Environ Res 32(2):305-313, 1983).

Secret #2: It is important to eliminate exposure to environmental carcinogens such as pesticides, coal or kerosene heaters, herbicides such as 2,4-dichlorophenoxyacetic acid, passive tobacco smoke, asbestos, radiation, and strong electromagnetic field exposure. These steps may be particularly important for clients of susceptible breeds (e.g., a Scottish terrier and herbicide exposure).

Commandments
Perhaps the greatest barrier to enhanced cure and control of cancer is that the caregiver and the veterinary health care team often have preconceived notions about cancer and its treatment. There are three commandments of cancer care that must be dealt with for patient and client comfort. They are:

- **Do not let them hurt.** Providing an active, preemptive, and ongoing pain management/prevention program for the dog with cancer is absolutely imperative. This reassures the caregiver that quality of life is optimal. Management should begin with comfort care and then, when needed, include oral medications (morphine, codeine, piroxicam (Feldene), carprofen, or others), transdermal delivery systems (fentanyl patches), acupuncture or more advanced analgesic delivery systems (e.g., constant rate intravenous infusion, epidural catheters, intrathoracic pleural analgesia).
- **Do not let them vomit or have diarrhea.** Dispensing oral medication such as metoclopramide or more recently, the novel NK-1 receptor antagonist, Maropitant (Cerenia)
to the caregiver each and every time a potentially nauseating drug is administered, empowers the caregiver to prevent and treat this symptom at home. Tylosin, metronidazol and imodium can reduce the risk of small and large bowel diarrhea and veterinarians often dispense these drugs to their cancer patients to prevent problems.

- **Do not let them starve.** Nursing care (e.g., warming food, providing aromatic foods and comfortable environments), medicinal appetite stimulants such as cyproheptadine megesterol acetate and mirtazipine, and assisted feeding techniques such as esophagostomy tube placement should be employed when needed.

**Secret #3:** Maropitant citrate (Cerenia) is a novel, effective NK1 receptor antagonist that is approved for the treatment of vomiting in the dog and is available as an injectable and oral product.

**Recent Advances in Cancer Care**

There is a xenogeneic DNA vaccine for the treatment of canine oral malignant melanoma using the human tyrosinase gene (*Clin Cancer Res 9*(4):1284-1290, 2003). This is the first time this type of therapy has been marketed in human or veterinary medicine. This novel approach using a gene from another species elegantly and simply induced a good immune response against the malignant melanoma, but not the patient’s own tissue.

**Secret #4:** The xenogeneic DNA vaccine for the treatment of oral malignant melanoma is an effective therapy that is at the forefront of a new wave of molecular therapeutics.

Doxorubicin has been shown to improve the disease-free interval in dogs that have had incompletely excised soft tissue sarcomas (*Selting, Proceedings Vet Cancer Society 2004*), and surgically resected hemangiosarcoma, osteosarcoma and is unquestionably the most effective drug for the treatment of lymphoma (*J Vet Intern Med 10*(6):379-84, 1996).

**Secret #5:** Doxorubicin is the most effective agent for the treatment of lymphoma and it has efficacy for the treatment of hemangiosarcoma, soft tissue sarcomas and osteosarcoma.

CCNU is an oral alkylating agent that has been shown to enhance response rates for dogs with T cell lymphoma. This drug induces a 50% response rate (8.3% CR) and median survival time of 128 days by Skorupski *et al* against histiocytic sarcoma (*Proceedings, Veterinary Cancer Society 2004*) and it has recently been shown to be helpful for treating mycosis fungoides. Dogs with mast cell tumors have also been effectively treated with this chemotherapeutic agent.

**Secret #6:** CCNU is effective for the treatment of lymphoma, histiocytic sarcoma, mycosis fungoides, and mast cell tumors.

Piroxicam and probably prevocox have been shown to have anticancer effects. Several studies have been performed confirming that piroxicam is effective for the treatment of transitional cell carcinoma and oral squamous cell carcinoma. Forty-eight dogs with histologically confirmed transitional cell carcinoma were treated with mitoxantrone and piroxicam (*Clin Cancer Res. 2003 Feb;9*(2):906-11) for an overall 35.4% measurable response rate but a subjective improvement occurred in 75% of treated dogs. Prevocox has recently been shown by Knapp *et al* as having anticancer effects vs. transitional cell carcinoma (*VCS Proceedings, 2007*).

**Secret #7:** Piroxicam has been shown to be very effective for the treatment of transitional cell carcinoma and squamous cell carcinoma in the dog. Prevocox appears to have anticancer effects against transitional cell carcinoma in dogs.

Primary lung tumors had been ineffectively treated until vinorelbine was shown to be effective (*J Vet Intern Med 18*(4):536-9, 2004). The investigators concluded that clinical activity observed in dogs with bronchoalveolar carcinoma treated with vinorelbine warrants further investigation.
Secret #8: Vinorelbine is a promising new agent for the treatment of pulmonary tumors in dog and cats.

Inadequately excited mast cell tumors have been shown to be effectively treated with vinblastine and prednisone. In one study, 27 dogs with inadequately excised, cutaneous mast cell tumors were treated with a vinblastine and prednisolone chemotherapeutic protocol. Twenty dogs were available for follow-up examination after 12 months. Over half were disease free after one year.

Secret #9: Vinblastine is a relatively safe and effective therapy for mast cell tumors in the dog.

Compassion Fatigue
When we care for our patients with compassionate care, we must do so by expressing empathy. The act of extending empathy as we care for our patients and their clients can lead to compassion fatigue. When any member of the veterinary health care team finds themselves giving more without allowing themselves to be replenished emotionally, it is only a matter of time before there will be a shortage of compassion. Simply put, compassion fatigue results when there is a depletion of emotional resources from within as we care and provide compassion for others. By appreciating the issue of compassion fatigue and providing mechanisms within a practice to mitigate its effects, a practice can thrive by providing the finest in compassionate care.

Secret #10: Recognizing and treating compassion fatigue is essential to enhance professional, personal and financial success.