

Supporting the Elderly Canine Cancer Patient



Chelsea Tripp, DVM, MS, DACVIM (O)
Veterinary Cancer Specialty Care
at Bridge Animal Referral Center

The majority of the patients we see in an oncology practice are older and also have multi-organ concerns. As we have more success with treating cancer, it is essential for us to manage the whole body system of the patient and continue to address these other health parameters to maintain good quality of life. Treating the cancer is only one piece of their quality of life.

This brief communication is not focused on the oncology therapies available, but rather, focuses on treating the whole patient whether they elect for advanced cancer care or not. Recognizing chronic pain and cognitive decline and starting sooner in the process of managing both will be important, as well as supporting their GI tract with the ever-changing flora from chemotherapy or even disease.

Here are some things to consider to help keep them aging with grace:

Mobility: Chronic pain is often underestimated in veterinary patients and medicine should be integrative and multimodal to optimize success. Keeping these patients moving with worsening arthritis and body condition changes is imperative. The use of non-steroidal anti-inflammatories (NSAIDs) poses challenges as organ function deteriorates with age and considering other approaches to control inflammation are necessary. Photobiomodulation (PMBT) with laser therapy is a viable consideration for these patients reducing their pain and lameness even with NSAID reduction (Looney 2018), as well as other modalities such as underwater treadmill, physical rehabilitation, mobility exercises and joint supplements.

Pain management with the addition of neuropathic pain coverage (Gabapentin, Amitriptyline), opioid drugs (Codeine, Methadone) and NMDA antagonists (Amantidine, Subcutaneous Ketamine injections) for a balanced multi-modal approach is needed. Acupuncture may also be a good multimodal option. Acupuncture has been shown to regulate inflammatory processes and growth factors by increasing blood flow in areas (Malfait 2014). In a prospective clinical trial using acupuncture alone or paired with analgesics, dogs with musculoskeletal pain had significant improvements in quality of life assessment tools. Both acupuncture and PMBT may allow patients to have lower dosages of conventional analgesics (Silva 2017, Looney 2018).



Cognition: Behavioral signs that are usually most disturbing to clients are those associated with anxiety, sleep-wake cycle and cognitive dysfunction syndrome (CDS). The prevalence of CDS in our geriatric patients ranges from 20-35% in those between 12-15 years of age but increases to greater than 65% in those patients greater than 15 years of age. (Landsberg 2011). With increasing age, dogs mobilize glucose less efficiently leading to decreased neuronal function. This is where medium-chain triglycerides (MCT) can become an alternate source of energy for the brain to fill the gap. MCT are able to enter cells without being broken down and readily cross the blood-brain barrier. There they are converted by astrocytes to ketone bodies which can be used as alternate energy source (Tynes 2021). An excellent source of MCT for canines is coconut oil, and when fed as 10 percent or less of the dog's diet poses no digestive or other health issues (Aldrich 2009). MCT supplements are also available in oil, powder and capsule form that have been extracted from coconut or palm kernel oils for ease of administration.

Omega-3, long chain, polyunsaturated fatty acids (PUFAs) mainly docosahexaenoic acid (DHA) and eicosapentaenoic acid (EPA) have long been known to decrease inflammation in many disease processes and are fundamental in brain function. They play an important role throughout the body as they are incorporated structurally into cell membranes and can also benefit brain health. Approximately 20% of the brain's cortex is made up of DHA which provides the structural support to the neurons. A 2012 study in Beagle puppies showed that dietary supplementation of fish oil rich in DHA following weaning resulted in improvement in memory, reversal task learning and psychomotor function during the developmental stage (Zicker 2012). Based on this, as well as current research, it is likely that EPA and DHA, alone or in combination with other ingredients, may play a role in reducing canine cognitive decline (Tynes 2021).

There are various foods and supplements fortified with fish oil available in the market. With this type of fortification these food products are highly susceptible to oxidation during storage. Utilizing products that employ emulsion and encapsulation technologies, is recommended to protect omega-3 oils as well as improving stability and bioavailability (Wang 2021).

Phosphatidylserine is a phospholipid that also makes up a major part of cell membranes. Typically manufactured from soy lecithin, it is the main ingredient in Senilife®. Paired with ginkgo biloba, Vitamin E, Pyridoxine (Vitamin B6) and grape skin extract, Senilife® has been shown to improve several signs of canine cognitive dysfunction (CCD) like improving sleep cycle, decreasing apathy and disorientation (Landsberg 2011, Landsberg 2012).

Antioxidants also benefit the cognitive health of dogs. SAME (s-adenosylmethionine) is the brain's major methyl donor and is responsible for forming a variety of compounds important for cell membrane structure and neurotransmission. SAME works in conjunction with folate and vitamin B12 and supplementing B-complex vitamin is also advised.

Multiple diets are now on the market that focus on adding enhanced levels of vitamins (B, C & E), antioxidants, omega-3 fatty acids, b-carotene, selenium, flavonoids, carotenoids, mitochondrial cofactors (DL-alpha-lipoic acid and L-carnitine) and DHA/EPA based on their ability to prevent or reduce cognitive decline and help support the overall needs of a cancer patient (Tynes 2021).

Appetite: In humans with dementia, the area of the brain that controls satiety becomes impacted as the disease progresses, and many have no desire to eat which ultimately progresses to dysphagia. We would expect the same to be true in our canine patients as cognition declines. Some approaches include changing the texture and consistency of their food, utilizing continuous appetite stimulants such as Capromorelin (Entyce®) and covering for ongoing reflex esophagitis when esophageal motility is likely slowed.

Digestion: Cancer alters the way a dog's body can metabolize protein, fats and carbohydrates. When the nutritional needs of these patients are not met, metabolically they experience weight loss with loss of muscle mass, which must be addressed. Dogs with cancer need higher good quality protein and fat levels and more complex carbohydrate loads, provided other disease processes allow.

There is also a growing body of evidence in the role for the gut microbiome and its relationship to the brain. The gap junctions in the lining of the gut and permeability of the GI tract changes with age and disease. This can lead to an imbalance of the normal gut microflora which can influence the CNS system directly by activating stress circuit pathways (Tillisch 2014). The influence of diet on this large reservoir of gut microflora has been well established. In humans, evidence suggests that age-associated changes in the gut microbiome parallel fluctuations in immune status. States of dysbiosis alter and deplete microbial function representing an avenue of therapeutic intervention. Supplementing with live culture probiotics and prebiotic fermentable dietary fiber can reset the microbiome and control inflammation (Foster 2013, Pilla 2020)

Keeping these considerations for diet and nutritional supplementation should enhance the quality of life for the cancer patient. They should also be used in conjunction with a comprehensive program of environmental management, enrichment, and/or behavior modification.

References:

- Silva NE, Luna SP, Joaquim JG, Coutinho HD, Possebon FS. Effect of acupuncture on pain and quality of life in canine neurological and musculoskeletal diseases. *Can Vet J*. 2017 Sep; 58(9): 941-951.
- Malfait AM, Schnitzer TJ. Towards a mechanism-based approach to pain management in osteoarthritis. *Nat Rev Rheumatol*. 2013;9:654-664
- Looney AL, Huntingford JL, Blaaser LL, Mann S. A randomized blind placebo-controlled trial investigating the effects of photobiomodulation therapy (PBMT) on canine elbow osteoarthritis. *Can Vet J*. 2018 Sep; 59(9): 959-966
- Zicker SC, et al. Evaluation of cognitive learning, memory, psychomotor, immunologic, and retinal functions in healthy puppies fed foods fortified with docosahexaenoic acid-rich fish oil from 8 to 52 weeks of age. *J Am Vet Med Assoc*. 2012 Sep 1;241(5):583-94.
- Wang J, Han L, Wang D, Sun Y, Huang J, Shahidi F. Stability and stabilization of omega-3 oils: A review. *Trends in Food Science & Technology* 118 (2021) 17-35.
- Pan Y, Landsberg G, Mougeot I, Kelly S, Xu H, et al. Efficacy of a Therapeutic Diet on Dogs With Signs of Cognitive Dysfunction Syndrome (CDS): A Prospective Double Blinded Placebo Controlled Clinical Study. *Front. Nutr.*, 12 December 2018.
- Landsberg G. Therapeutic Options for Cognitive Decline in Senior Pets. *J Am Anim Hosp Assoc* (2006) 42 (6): 407-413.
- Tynes V & Landsberg G. Nutritional Management of Behavior and Brain Disorders in Dogs & Cats. *Vet Clin Small Anim* 51 (2021):711-727.
- Landsberg G, Deporter T, Araujo JA. Clinical Signs and Management of Anxiety, Sleeplessness, and Cognitive Dysfunction in the Senior Pet. *Vet Clin Small Anim* 41 (2011) 565-590.
- Landsberg G, Nichol J, Araujo JA. Cognitive dysfunction syndrome: a disease of canine and feline brain aging. *Vet Clin North Am Small Anim Pract*. 2012 Jul; 42(4): 749-68.
- Tillisch K. The effects of gut microbiota on CNS function in humans. *Gut Microbes* 5:3, May/June (2014) 404-410.
- Foster JA, McVey-Neufeld KA. Gut-brain axis: how the microbiome influences anxiety and depression. *Trends Neurosci* 2013; 36:305-12.
- Pilla R, Suchodolski JS. The Role of the Canine Gut Microbiomes and Metabolome in Health & Gastrointestinal Disease. *Front Vet Science*. 2020 Jan 14; 6:498.

Drugs:

Senilife - Ceva Animal Health, LLC 8735 Rosehill Road, Suite 300 Lenexa, KS 66215, USA

Entyce - Aratana (Now Elanco Animal Health) Therapeutics, 11400 Tomahawk Creek Parkway, Suite 340, Leawood, KS 66211, USA.

