

THE ANTIOXIDANTS ADJUVANT DIET THERAPIES AN IMMUNE ENHANCER FOR THE CANCEROUS BODY

¹Iulia CRÎNGANU, ²Raluca NEGREANU, ³Dan CRÎNGANU

¹The University of Agronomic Science and Veterinary Medicine
Bulevardul Mărăști 59, București 011464, Romania
021 318 2266

^{2,3}The Faculty of Veterinary Medicine, Splaiul Independentei 105
Sector 5 - cod 050097, Bucuresti - Romania
Tel: 021.318.04.69, Fax: 021- 318.04.98

Corresponding author email: iuliacrिंग@yahoo.com

Abstract

Cachexia and immunosuppression in cancer are the most common and complex paraneoplastic syndromes caused by tumor development based on the resources of the cancerous body. It is characterized by a progressive loss in weight due to disorders of carbohydrate metabolism, lipid and hydro protidic disorders associated with endocrine manifestations, especially hematological and blood chemistry or dysproteinemia, severe hypoalbuminemia, hypoglycemia, anemia, lymphopenia and a decreased immune function even when given adequate nutrition. Cachexia of the cancerous organism causes a reduced quality of life, a poor response to treatment and reduced survival. Cancer cells use carbohydrates like blood glucose and tissue glycogen to power their metabolism draining the body of amino acids, due to the "nitrogen hunger". But cancer can not use lipids for energy metabolism, thus diets with a high fat content may slow tumor growth.

Nonspecific immunotherapy (immunomodulators) associated with antioxidant nutrients such as vitamins, microelement minerals and some inhibitors of proteases found in various nutritional supplements have significant effects in the prevention, control of the disease and increase the efficiency of anticancer treatment.

Dogs and cats with cancer can register the same decline in immune function as humans and therefore can benefit from adaptogens used in human oncology medicine.

Key words: malnutrition, immunosuppression, Escozul, antioxidants, cachexia.

INTRODUCTION

The role of antioxidants is shown both in preventing and treating cancer and paraneoplastic syndromes accompanying cancerous disease. Antioxidants form the first barrier of the body against oxygen reactive species (ORS), known as free radicals generated during aerobic metabolism. Excessive amount of free radicals is harmful, manifested by oxidative stress and damaged cellular lipids, nucleic acids and proteins. Enzymes that prevent the formation of ORS or facilitate "repair" of denatured DNA include CoQ10, vitamins C and E, taurine and carotenoids. Other nutrients, especially zinc, magnesium, iron, selenium and copper are integrated in the form of antioxidant enzymes. These secondary antioxidant nutrients act by blocking the ORS plan.

Oxidative damage is implicated in the pathogenesis of chronic aging, cancer and certain chronic diseases such as the malfunction of the immune system.

The immune system is very sensitive specifically to oxidative stress, primarily because of the immunity response coordination relies heavily on cell-cell communication. Peroxidation of cell membranes compromising the structure and function of membrane, thereby disrupting signal transduction processes by which cells communicate with each other. Normally, immune cells have a much higher antioxidants than other cells, in order to counteract the increased risk of oxidative damage. Therefore, deficiency of dietary intake level of antioxidants in feeding may lead to suppression of the immune system.

This may explain the association between the malnutrition, low immune status and increased incidence of cancer. Soluble vitamins can strengthen the immune system, reduce the level of carcinogens, block the action of carcinogens and stop the development of certain cancers. Vitamins and antioxidants including vitamin A, vitamin E, vitamin C, selenium, β -carotene, can influence the growth and metastasis of tumor cells via various mechanisms and are indispensable for all cancer patients regardless of species. Also very important for cancer patients, regarding the process that undergoes in order to stabilize the cell membrane, are the fatty acids and the components of the omega-3 series, acid gamma-linolenic and coenzyme Q-10. Also they destroy free radicals (OH, O) which are harmful chemical species also formed in the body under normal conditions. They have a free electron which makes them highly reactive and capable of destroying neighboring molecules that they incorporate, such as DNA, RNA, proteins and lipids. Also help by blocking synthesis and reducing levels of carcinogens in the bowels. Nitrites (used as preservatives for certain edible products) in combination with some amines formed in the intestine nitrosamines result are the strongest carcinogens, but the presence of vitamins C and E in the stomach can prevent or reduce the formation of these nitrosamines. Another pro argument is the reduced levels of the c- myc oncogene expression in some cancer cells "in vivo" and suppressed expression of H-ras oncogene in some tumor cells "in vitro".

MATERIALS AND METHODS

Experiments were conducted in the Oncology Clinic of the Faculty of Veterinary Medicine Bucharest and a private veterinary medical practice.

We followed 12 canine patients (dogs) and 12 feline patients (cats) with various forms and stages of cancer each divided into 3 experimental groups. For the immune boost of the patients with cancer we used the following products: OncoVet and Oncosupport rich in antioxidants and Escozul, an

immunomodulator homeopathic product - alcoholic extract of blue scorpion venom produced in Cuba, along with chemotherapy.

To ease the administration of nutritional supplements OncoVet, Oncosupport and wild Alaskan Salmon Oil and respect the daily doses/kg (body weight) we used standardized commercial products, rich in vitamins and antitumor microelements, entire time of the patients' survival.

Animals in all groups received specific treatments alongside conventional (pre-op chemotherapy, solid tumors were surgically excised and appropriate post-therapy).

- Batch 1A - 4 dogs, 2 mammary tumors in different TNM stage and 2 malignant lymphomas received therapy with cytostatic alkylating agents - Holoxan 200mg/m²/day and Carboplatin 1 mg/ Kg up to 14 days before and after surgery

- Batch 1B - 4 cats, 2 mammary tumors in different TNM stages and 2 cats with lymphoma received chemotherapy with alkylating agents (Ciclofosfamida 50 mg/m²/day) and anthracycline (Epidoxorubicina) at a dose of 1 mg/Kg up to 14 days ante and post-op.

OncoVet was administered at a dose of 1/4 tb/ 4 kg/ day for felines patients and 1 tablet/20 kg canine patients. Oncosupport was used at the same time a beaker per 22 kg for the dogs and a quarter of the beaker per 4kg for the cats.

- Batch IIA - 4 dogs 2 females with mammary tumors in different TNM stages and 2 males with lymphoma received chemotherapy alkylating agents - Holoxan 200 mg/m²/day and Carboplatin 1 mg/Kg up to 14 days before and after surgery.

- Batch IIB - 4 cats with lymphoma, received anthracycline chemotherapy (Epidoxorubicina) at a dose of 1 mg/Kg up to 14 days before and after the surgery.

For batches IIA si IIB the classical chemotherapy was associated with administration of:

Escozul 5 gts./ 4 kg/day per os for the cats and 1 ml/20 kg/day per os for the dogs.

Wild Alaskan Salmon Oil rich in omega-3 and DHA-docosaheanoic acids, eicosapentaenoic acid, EPA and Omega 6 was

administered at a dose of 1 ml/ 4 kg/ day for the cats and 5 ml /20 kg· day for the dogs.

- Batch IIIA - 4 dogs, 2 females with mammary tumors in different TNM stages and 2 males with malignant lymphomas, received only conventional chemotherapy same as batches IA and IIA.

- Batch IIIB of 4 cats, 2 with mammary tumor and 2 with lymphoma received only conventional chemotherapy same as batches IB and IIB.

RESULTS AND DISCUSSIONS

Administration of commercial products Oncovet and Oncosupport to batches IA and IB showed favorable metabolic effects to amend anorexia symptoms and fast metabolic recovery of the oncologic patients that had received chemotherapy, as demonstrated by the improving physiological values of all proteins, albumin and liver enzymes.

Immunosuppression was obviously corrected in group IIA for the dogs treated with Escozul 45 days, this being expressed by the increasing in the percentage of lymphocytes in blood counts and the antigen in peripheral blood smears. Less obvious results were observed in group IIB (cats). The cats metabolic peculiarities stand out proving that this is a genuine carnivore in need of linoleic acid (polyunsaturated fatty acid) which is a precursor of prostaglandins. The feline stores in its kidney vitamin A, but doesn't necessarily have the enzymatic machinery to synthesize the tryptophan, being dependent on external intake. Felines digest efficiently moderate amounts of carbohydrates (starch, lactose, sucrose), glucose is only part of the energy flow to the intestines. The essential amino acids (Arginine, Taurine in conc. 300-400 micro mol/liter) can not be synthesized by the cat, so it is very susceptible to deficiencies, requiring dietary intake.

Our studies have indicated that the feeding of increased doses of antioxidant supplements can be used in the prevention of nutritional deficiencies associated with the immune response enhancing therapy in cats. The ability of antioxidants in the diet is to improve immune function by inducing proliferation of lymphocytes expressing T and B

lymphocytes, the number and efficiency of the T-helper cells and T-killer cells and the growth of antibody responses, possibly through better regulation and expression of the interleukin-2 (IL-2). Antioxidants are also likely to be able to induce decrease of prostaglandin (PG) E₂, which normally acts by reducing the anti-inflammatory and immunosuppressive antibody response and cell-mediated decrease in the manifestation of lymphocyte proliferation IL-2. Cancerous body homeostasis relies on the use of nutritional supplements that provide the necessary proteins, carbohydrates, lipids, vitamins, thin minerals, trace elements and other elements indispensable for life.

CONCLUSIONS

Better blood values were expressed in markers (urea, creatinine, GPT, GOT, bilirubin) in the batches of patients treated with the combination of nonspecific immunotherapy, chemotherapy, homeopathic (Escozul) and with a diet rich in antioxidants compared to the batches treated only by conventional chemotherapy and normal food.

Administration of food supplements enriched with antioxidants and anticancer action (OncoVet and Oncosupport) had a better response in canine patients allowing a more rapid remission and correction of anorexia.

Prevention of anorexia and weight loss for both canine and feline patients with cancer was achieved by creating a diet with high bioavailability, easy to digest and tasty.

Antioxidants in food have a particular effect in preventing cancer disease-related decline in immune function.

The nutritional supplements rich in antioxidants (vitamin A, C, E, Se) used by us manifested in cats through increasing nonspecific immunity, by elevating antigen-stimulated lymphocytes.

Dogs respond quickly and effectively to nonspecific immunostimulation (Escozul) and therefore showed a greater efficacy regarding adjuvant therapy compared to our feline patients.

Outcome studies suggested that antioxidant supplementation in diet associated with

nonspecific immunotherapy with Escozul has a beneficial effect on the immune system, especially in advanced forms of cancer.

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