

NUTRITIONAL THERAPY IN CLINICAL MANAGEMENT OF ONCOLOGICAL PATIENTS

Assist. Prof. PhD Student Blebea Nicoleta Mirela¹

¹ Faculty of Pharmacy, Ovidius University of Constanța, Romania

¹ Faculty of Pharmacy, University of Medicine and Pharmacy Carol Davila, Romania

ABSTRACT

Nutritional therapy helps patients with cancer to maintain their weight within normal limits, maintain tissue integrity and reduce the side effects of cancer therapies. Nutritional oncology deals with both prevention and patient support during treatment, in convalescence and in palliative situations. Cancer patients need full support from the team of health professionals (oncologists, nurses and dietitians). The following basic elements should not be missing from the cancer patient's diet: water, protein intake, animal and vegetable fats, as well as vitamins and minerals. The diet of cancer patients should be closely monitored, as body weight should be kept within normal limits, ie a body mass index (BMI) between 19 and 24 (the calculation is made by dividing the weight by the square of the height). The oncologist should therefore be aware of the adverse effects of malnutrition on patient outcomes and view nutritional support as an essential component of the clinical management, chemotherapy, radiation therapy, antiemetic treatment, and treatment for pain.

Keywords: *cachexia, cancer-related malnutrition, clinical management, nutritional therapy, oncological patients*

INTRODUCTION

Oncological diseases, as well as their treatment, can cause changes in the diet by affecting the taste, smell, appetite, without being satiated and the body's ability to absorb nutrients from food. Affecting the taste can make patients want more sweet foods, no longer tolerate strong flavors, increased sensitivity to bitter taste and aversion to meat. Tumors can partially block the digestive system or make swallowing food painful or difficult. Other factors, such as chronic pain, painkillers, fatigue, depression, fear, and anxiety associated with cancer, can lead to decreased appetite. All forms of treatment have certain side effects, including loss of appetite, nausea, vomiting or decreased immunity [1].

Nutrition is the process by which food is used by the body for growth, for maintaining health, and tissue repair. Consuming the right foods before, during and after cancer treatment helps the patient feel better and stronger. Progressive deterioration of nutritional status is a common feature of cancer patients. Consequently, it is estimated that > 50% of hospitalized cancer patients are

malnourished. Cancer-related malnutrition (CRM) is universal and occurs in 50% -80% of patients with cancer [2], [3], [4]. CRM is estimated to be the immediate cause of death in 20% -40% of cancer patients. Moreover, CRM is not just synonymous with weight loss; it is a process with a complex etiology and involves weight loss as a highly visible component that results in progressive muscle exhaustion [4], [5], [6], [7].

Currently, according to studies, in the practice of cancer, nutritional support is provided only for 30% -60% of cancer patients already at risk of malnutrition [8], [9], [10]. In this context, a correct and early diagnosis of CRM through screening and assessment of nutritional status and a multimodal therapeutic approach targeting nutrition along with other factors involved in the pathophysiology of CRM is of utmost importance in the management of cancer patients [8], [11].

In a survey based on a questionnaire addressed to oncologists in Turkey, on the planning of nutritional therapy at the same time as the initial diagnosis of cancer, 46.0% of oncologists identified patients with visible weight loss (28.0%). The authors concluded that diagnosis and practices need to be improved in terms of the use of evidence-based malnutrition screening tools, consultation of clinical nutritionists on the provision and monitoring of nutritional support, and appropriate advice on oral nutritional supplements (ONS) [12]. As a result, current clinical management of CRM remains limited and complex [7], [12] despite the association of CRM with higher rates of hospitalized cancer patients, long hospital stays, poor tolerance to cancer treatment, poor quality of life and decreased survival of cancer patients [11], [12].

Currently, most oncologists believe that weight loss and muscle mass are an inevitable consequence of progressive tumor growth and therefore focus on better control of tumor growth [13].

The terms "malnutrition", "weight loss" and "cachexia" have been used frequently in recent years, the term "cancer-related malnutrition" is considered more appropriate for cancer patients because cachexia suggests that the patient is in the terminal stage of the disease. Due to poor nutrient intake and metabolic changes underlying CRM, optimized nutritional support can prevent further deterioration of nutritional status only if not combined at an early stage with anabolic / anticatabolic agents [11].

Consequently, CRM is defined as a complex multifactorial process characterized by weight loss and changes in body composition, a key feature it is a severe and specific loss of muscle mass with relative preservation of the viscera, a protein mass that cannot be completely reversed by conventional nutritional support that will lead to progressive functional impairment [7], [11], [12]. Major signs of CRM include anorexia, inflammatory, metabolic and endocrine changes, increased tissue protein volume and loss of muscle mass [11], [12].

Identifying the special needs of each patient and providing nutritional support in accordance with an individualized nutritional plan developed with the help of teams of health professionals (oncologists, nurses and dieticians) is crucial for improving the nutritional status of cancer patients. Counseling is an effective and inexpensive method in combination with other nutritional interventions, which leads to improved nutritional intake in patients undergoing chemotherapy and improved quality of life in patients undergoing radiotherapy [12].

Nutritional support for cancer patients

To detect nutritional disorders at an early stage, the European Society for Clinical Nutrition and Metabolism (ESPEN) recommends nutritional intake, weight assessment and BMI should be assessed regularly, starting from the initial diagnosis of cancer [12].

Total energy, costs of cancer patients, if not measured individually, can be assumed to be similar to that of healthy subjects, generally ranging from 25 to 30 kcal / kg per day, and protein intake should be > 1 g / kg per day and, if possible, up to 1,5 g / kg per day [8].

Individualized nutritional intervention is recommended based on nutritional status a patients and should include dietary advice, treatment of symptoms and disorders affecting food intake (symptoms of impact on nutrition) and nutritional support is provided as ONS, enteral nutrition feeding through the gastric or jejunal tube. From a practical point of view, if malnutrition already exists or if food intake is significantly reduced for > 7-10 days, the nutritional approach should be based on the integrity of the gastrointestinal tract and gastrointestinal function. Intact gastrointestinal and parenteral nutrition should be used in patients with impaired gastrointestinal function [5], [12]. Enteral nutrition is always preferred for cancer patients who have an intact digestive tract due to a lower risk of complications, improved quality of life and lower costs compared to the administration of parenteral nutrition [5], [12].

Arginine supplementation is thought to increase specific and nonspecific antitumor mechanisms, as well as delay tumor growth and prolong survival, as arginine is essential for the normal functioning of T lymphocytes. has been shown to increase the long-term survival of patients with head and neck cancer undergoing surgery and chemotherapy. The use of arginine supplements in the treatment of CRM in cancer patients reported an increase in BMI and albumin levels [, as well as improved overall survival, in patients with head and neck cancer and a shorter hospital stay in cancer patients [12].

Vitamin D plays a role in reducing the cachexia of cancer patients because it has been shown to suppress IL-6, a proinflammatory cytokine that is a key mediator of muscle loss seen in cancer cachexia [12]. Vitamin D (2000 IU daily for 12 weeks following the 4-week placebo study has been reported to improve

muscle weakness in prostate cancer patients; also low plasma concentrations and combined scores for proinflammatory markers (C-reactive protein, tumor necrosis factor, IL-6, IL-1b and IL-8) in sporadic colorectal adenoma when used over a 6-month period at a dose of 800 IU / day [12].

The basics that should be part of a patient's diet oncological

Fluids

The volume of fluid is generally recommended not to exceed 30-35 ml / kg body weight per day; the interval may change depending on the patient's hemodynamic status, the presence of fever or loss of body fluid [5], [12].

Water is needed for all the cells in the body to function. If the patient does not drink enough fluids or loses them through vomiting or diarrhea, dehydration may occur, with adverse consequences for the body. Signs of dehydration are: dry mouth, dark and little urine, dizziness, inattention, persistent skin crease when tightening the skin on the chest or between the fingers.

Energy

It is suggested that adequate energy targets for bedridden and outpatient cancer patients are 20-25 kcal / kg per day and 25-30 kcal / kg per day, respectively, to improve lean body mass and increase the production of anabolic proteins in the liver [12].

Macronutrients

According to recent recommendations, protein intake should be > 1 g / kg per day and, if possible, up to 1.5 g / kg per day in cancer patients. In patients with normal renal function, protein intake at doses up to and greater than 2 g / kg per day is safe; in patients with acute or chronic renal failure, the protein intake should not exceed 1 or 1.2 g / kg per day, respectively [2], [12].

Consistent with the oxidative rate of glucose, the recommended carbohydrate intake (glucose) is <5 g / kg per day [2], [12]. Current guidelines suggest that optimal carbohydrate intake in cancer patients should not exceed 40% -50% of non-protein energy requirements. Lipids are efficiently mobilized and metabolized by cancer patients and are therefore a valid source of energy in this context. Providing up to 50% of non-protein calories from fat is feasible and safe in cancer patients.

Adequate protein intake is essential during all stages of the cancer patient's treatment and long-term survival.

Carbohydrates are found in vegetables, fruits, whole grains (foods rich in fiber, vitamins, minerals), potatoes, rice, corn, peas, beans, dried grains (foods rich in B vitamins and fiber).

Animal and vegetable fats are an important source of energy because they provide twice as many calories / gram as carbohydrates and are used to store energy, repair tissues and carry some vitamins in the blood.

Unsaturated fats (mono- and poly-) are healthier than saturated fats (fatty fish - salmon, trout, tuna, vegetable oils, oilseeds, seeds). Monounsaturated fats are olive, peanut vegetable oils. Polyunsaturated fats are vegetable oils of sunflower, saffron, corn, flaxseed, seafood.

Micronutrients

Nutritional supplement formulas usually contain electrolytes. Blood electrolyte levels should be closely monitored and supplementation should be adjusted according to the needs of each patient [5], [12]. Vitamins and minerals are necessary for the proper functioning of the body.

Common side effects of treatment (nausea, vomiting, mucus or mouth sores) can lead to a hydroelectrolytic and vitamin imbalance. As a result, multivitamin and mineral supplements are allowed, but should not replace dietary intake. Vitamins should be administered only with the recommendation of a specialist or nutritionist, with special attention to products rich in vitamin B12, which has an important role in cell proliferation.

Vitamins and minerals are recommended in physiological doses, while the use of high-dose micronutrients is discouraged in the absence of specific deficiencies. Vitamin D deficiency is commonly seen in cancer patients and is associated with the incidence and prognosis of cancer [8].

CONCLUSION

In the case of patients diagnosed with neoplastic diseases, malnutrition syndromes frequently occur. They negatively affect the prognosis of the disease through the appearance of related diseases, delayed treatment, prolonged hospitalization of patients. For this reason, adequate nutritional support is very important to provide the body with the necessary energy, the optimal amount of micro and macro-nutrients, so that curative or palliative treatment can be performed in optimal conditions.

The purpose of this article was to provide a practical nutritional approach to aspects of changing the diet of oncological diseases patients. The paper contains preventive measures for CRM as well as non-pharmacological (nutritional support) and pharmacological (pharmaconutrient) measures.

Vitamins and minerals are recommended in physiological doses, while the use of high-dose micronutrients is discouraged in the absence of specific deficiencies.

REFERENCES

[1] Blebea N.M., Bucur L. A., Pharmacotherapeutic options in neoplastic diseases, *Farmacist.ro*, Romania, no198/Issue 5, pp18-20, 2021.

[2] Fearon K. C., Cancer cachexia: developing multimodal therapy for a multidimensional problem, *European journal of cancer*, U.K., vol.44/issue 6, pp.1124–1132, 2008.

[3] Sánchez-Lara K., Turcott J. G., Juárez-Hernández E., Nuñez-Valencia C., Villanueva G., Guevara P., De la Torre-Vallejo M., Mohar A., & Arrieta O., Effects of an oral nutritional supplement containing eicosapentaenoic acid on nutritional and clinical outcomes in patients with advanced non-small cell lung cancer: randomised trial, *Clinical nutrition*, Scotland, vol.33/issue 6, pp.1017–1023, 2014.

[4] Fearon K. C., Glass D. J., & Guttridge D. C., Cancer cachexia: mediators, signaling, and metabolic pathways. *Cell metabolism*, U.K., vol.16/issue 2, pp.153–166, 2012.

[5] Muscaritoli M., Molfino A., Laviano A., Rasio D., & Rossi Fanelli F., Parenteral nutrition in advanced cancer patients, *Critical reviews in oncology/hematology*, Italy, vol.84/issue 1, pp.26–36, 2012.

[6] Muscaritoli M., Anker S. D., Argilés J., Aversa Z., Bauer J. M., Biolo G., Boirie Y., Bosaeus I., Cederholm T., Costelli P., Fearon K. C., Laviano A., Maggio M., Rossi Fanelli F., Schneider S. M., Schols A., & Sieber, C. C. , Consensus definition of sarcopenia, cachexia and pre-cachexia: joint document elaborated by Special Interest Groups (SIG) "cachexia-anorexia in chronic wasting diseases" and "nutrition in geriatrics", *Clinical nutrition* , Scotland, vol.29/issue 2, pp.154–159, 2010.

[7] Fearon K., Strasser F., Anker S. D., Bosaeus I., Bruera E., Fainsinger R. L., Jatoi A., Loprinzi C., MacDonald N., Mantovani G., Davis M., Muscaritoli M., Ottery F., Radbruch L., Ravasco P., Walsh D., Wilcock A., Kaasa S., & Baracos V. E., Definition and classification of cancer cachexia: an international consensus, *The Lancet, Oncology*, U.K., vol.12/issue5, 489–495, 2011.

[8] Arends J., Baracos V., Bertz H., Bozzetti F., Calder P. C., Deutz N., Erickson N., Laviano A., Lisanti M. P., Lobo D. N., McMillan D. C., Muscaritoli M., Ockenga J., Pirlich, M., Strasser F., de van der Schueren M., Van Gossum A., Vaupel P., & Weimann, A., ESPEN expert group recommendations for action against cancer-related malnutrition, *Clinical nutrition*, Scotland, vol.36/issue 5, pp.1187–1196, 2017.

[9] Hébuterne X., Lemarié E., Michallet M., de Montreuil C. B., Schneider S. M., & Goldwasser F., Prevalence of malnutrition and current use of nutrition support in patients with cancer, *JPEN, Journal of parenteral and enteral nutrition*, U.S. vol.38/issue2, pp.196–204, 2014.

[10] Planas M., Álvarez-Hernández J., León-Sanz M., Celaya-Pérez S., Araujo K., García de Lorenzo A., & PREDyCES® researchers, Prevalence of hospital malnutrition in cancer patients: a sub-analysis of the PREDyCES® study. *Supportive care in cancer : official journal of the Multinational Association of Supportive Care in Cancer*, Spain, vol. 24/issue1, pp.429–435, 2016.

[11] Tuca A., Jimenez-Fonseca P., & Gascón P., Clinical evaluation and optimal management of cancer cachexia, *Critical reviews in oncology/hematology*, U.S., vol.88/issue3, pp.625–636, 2013.

[12] Yalcin S., Gumus M., Oksuzoglu B., Ozdemir F., Evrensel T., Sarioglu A. A., Sahin B., Mandel N. M., Goker E., & Turkey Medical Oncology Active Nutrition Platform, Nutritional Aspect of Cancer Care in Medical Oncology Patients, *Clinical therapeutics*, U.S., vol.41/issue11, pp.2382–2396, 2019.

[13] Bruggeman A. R., Kamal A. H., LeBlanc T. W., Ma J. D., Baracos V. E., & Roeland E. J., Cancer Cachexia: Beyond Weight Loss, *Journal of oncology practice*, U.S., vol.12/issue 11, 1163–1171, 2016.