



Guidelines for Nutritional Evaluation and Management of Patients with Gastrointestinal Cancer

Jun Heo

Department of Internal Medicine, Kyungpook National University Hospital, Daegu, Korea

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Corresponding author: Jun Heo, E-mail: hero797@hanmail.net, <https://orcid.org/0000-0003-3180-1655>

QUESTION: A 71-year-old female was diagnosed with bile duct cancer and is currently undergoing palliative chemotherapy. The patient's current weight is 38 kg and height is 155 cm. The patient heard on the Internet protein supply is important in cancer treatment and is taking protein supplementary drink that can be found in online store. Can you provide any medical advice for this patient?

ANSWER: Checking the exact amount of amino acid in her daily diet is the first step. Generally, protein supply for cancer patients is at least 1 g/kg/day. If possible, it is recommended to supply more than 1.5 g/kg/day. However, research on what types of amino acids to supply is insufficient. If the amount of amino acid in her daily diet is below 1.5 g/kg/day, adding protein supplementary drinks is recommended to meet the protein requirement. In addition, it is important not only to focus on protein but also to maintain well a balanced diet with total calories of 25–30 kcal/kg/day.

REVIEW: Cancer patients are a typical chronic wasting disease. As the disease progresses, oral intake decreases and energy metabolism increases, leading to worsening nutritional deficiencies. Additionally, there may be nutritional losses associated with chemotherapy, radiation therapy, or surgical treatment, so nutritional evaluation and management are important. The clinical nutrition guidelines for cancer patients developed by the European Society of Intravenous and Enteral Nutrition, was revised in 2021 [1].

Nutritional screening is the process of quickly selecting patients at risk of malnutrition, and nutritional assessment is the process of diagnosing the exact nutritional status of the selected patients. First, it is recommended to regularly check intake, weight change, and body mass index as a nutritional screening. Screening tests that combine these factors include Malnutrition Universal Screening Tool and Nutritional Risk Screening 2002 [2]. In particular, it is recommended to check repeatedly depending on the time when cancer is diagnosed and changes in clinical situations. If an abnormality is found in a screening test, an objective and quantitative approach is needed to evaluate intake, nutritional symptoms, muscle mass, physical performance, and degree of systemic inflammation.

In order to maintain a stable nutritional status, meals that meet the calorie needs of individual patients must be supplied. The required calories are total energy expenditure (TEE), which is the sum of resting energy expenditure (REE), physical activity, and a small amount of diet-induced thermogenesis. Indirect calorimetry is the gold standard for measuring REE, but it has the disadvantage of being expensive. A common method is to input gender, height, weight, and age into the Harris-Benedict equation. In cancer patients, TEE is measured individually, and if it is difficult to measure, it can be set at 25–30 kcal/kg/day, similar to that in healthy people.

If malnutrition continues due to a chronic disease such as cancer, fat loss and muscle wasting processes lead to weight



loss and a decrease in muscle mass and strength, ultimately progressing to cachexia. Cachexia is closely related to the patient's prognosis or survival rate. The method for calculating the required protein uses the nitrogen balance equation. Typically, protein supply for cancer patients is at least 1 g/kg/day, and if possible, it is recommended to supply more than 1.5 g/kg/day. Several studies have shown that muscle protein production is not impaired even in cancer patients if amino acids are supplied in sufficient doses [3]. However, research on what types of amino acids to supply is insufficient. For patients with insulin resistance and weight loss, it is recommended to increase the proportion of calories consumed from fat rather than carbohydrates. This is to increase energy density and reduce blood sugar burden. Additionally, replacing glucose with lipid in intravenous nutrition has the advantage of reducing the risk of infection related to hyperglycemia [4].

It is recommended that you take in only the daily recommended amount of vitamins and minerals, which are micronutrients, and not take in high doses unless you have a specific deficiency. Studies have shown that vitamin D deficiency is associated with cancer, but it has not been proven that taking vitamins C, D, E, or selenium has a cancer prevention effect. There is no specific, consistently proven diet that can treat or prevent cancer [5]. The ketogenic diet (a very low carbohydrate, high fat diet) or fasting may be effective in some cancer patients, but considering that such diets can worsen nutritional deficiencies and cause micronutrient deficiency, they are not recommended.

Cancer patients are recommended to maintain or increase physical activity to maintain muscle mass, physical function, and metabolic pattern. In cancer patients, physical activity improves aerobic capacity, muscle strength, health-related quality of life, self-esteem, fatigue, and anxiety. To maintain muscle mass and strength, individualized resistance exercise is recommended in addition to aerobic exercise.

Appropriate nutritional treatment is closely related to increasing the survival rate as well as the quality of life of cancer patients. This is due not only to the direct effect of

nutritional supply, but also to the fact that nutritionally sound patients can receive better treatment. As a digestive cancer doctor, if you are well aware of nutritional evaluation and management guidelines and can apply them to patients, I expect that it will have a synergistic effect on the effectiveness of existing cancer treatments.

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CONFLICTS OF INTEREST

No potential conflict of interest relevant to this article was reported.

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