

Nutrition of patients during radio and chemotherapy

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Abstract

The most common method of cancer treatment still includes surgical treatment, which is also the oldest way to fight cancer. Radiotherapy is currently one of the basic method of treating malignant tumors [1]. This method uses the action of ionizing radiation. However, the radiation does not work selectively and also damages healthy tissues. Chemotherapy - the youngest method of cancer treatment - consists in administering to patients cytostatics that block the basic life functions of the cell, mainly by disrupting the ability to divide and multiply cancer cells.

Each of the mentioned therapeutic methods may cause side effects in addition to the therapeutic effect. Anorexia, vomiting, nausea and diarrhea or constipation are most often observed. During radiotherapy and chemotherapy, patients observe changes in taste, dry mouth and the possibility of oral irritation [2]. Through the occurrence of side effects of radio and chemotherapy, patients are exposed to the development of malnutrition and even cachexia.

For this reason, intensive counseling and individual diet modification should be used in all patients undergoing radio and chemotherapy.

Key words: malnutrition, cancer, dietary recommendations

Introduction

The most common method of cancer treatment still include surgical treatment, which is also the oldest way to fight cancer. Radiotherapy is currently one of the basic method of treating malignant tumors [1]. This method uses the action of ionizing radiation. The most important feature that determines the effectiveness of radiotherapy is the radio sensitivity of tumor cells [3]. However, ionizing radiation does not work selectively and also damages healthy tissues. In the pioneering period of radiotherapy, single high doses of radiation were used, which led to curing the tumor, but was associated with a very extensive necrosis of surrounding healthy tissues and even difficult to control bleeding due to destruction of the blood vessel wall and other serious complications. To prevent this, a method of dividing the total radiation dose into smaller doses but more often given (so-called dose fractionation) was introduced.

Through this, it has managed to maintain the same therapeutic effect while minimizing side effects. The development of dose fractionation was the basis of modern radiotherapy, which is now a safe and very effective method of treatment of many malignant tumors. Chemotherapy is the youngest method of cancer treatment and relies on giving to patients cytostatics that block the basic vital functions of the cell, mainly by disrupting the ability to divide and multiply cancer cells. Cytostatics may also damage normal cells, mainly those that quickly multiply, such as bone marrow cells. Combination therapy is also often used, which involves using several methods in the right order and time, combining surgery or radiotherapy with chemotherapy.

Each of the mentioned therapeutic methods may cause side effects. Anorexia, vomiting, nausea and diarrhea or constipation are most often observed. During radiotherapy or/and chemotherapy, patients observe changes in taste, dry mouth and the possibility of oral irritation [1].

Side effects of treatment

Although many patients undergoing radio and chemotherapy may respond well to the treatment, a very large percentage of side effects appear, significantly affecting the diet [2]. Both surgical treatment and radiotherapy, chemotherapy cause a variety of disorders that affect the overall nutritional status of the patient. Table 1 shows the nutritional consequences resulting from the surgical procedure which is organ excision.

Table no 1. The effect of radical excision of the organ on the nutritional status [4].

Resected organ	Nutritional consequences
Tongue and throat	Tube feeding (dysphagia)
The pectoral section of the esophagus	Impaired absorption of fat in the results of vagotomy Gastric fluid due to vagotomy
Stomach	Anemia, impaired absorption of fat, iron, calcium and vitamins, Dumping syndrome
Duodenum	Biliary - pancreatic insufficiency
Jejunum	Reduction in the absorption of glucose, fats, proteins, folic acid, vitamin B12
The ileum or ileocecal valve	Impaired absorption of vitamin B12, salts of fatty and bile acids
Small intestine (75%)	Impaired absorption of fats, glucose, proteins, folic acid, vitamin B12 Diarrhea
Jejunum and ileum	Unavailable total absorption
Large intestine (complete or almost total resection)	Loss of water and electrolytes
Pancreas	Impaired absorption and diabetes
Liver	Transient hypoalbuminemia

Radiotherapy can cause so-called "nutritional" complications. It distinguishes early complications and late complications which are presented in table no 2.

Table No. 2 Nutritional complications related to radiotherapy [4]

Radiotherapy exposed area	early side effects	Late side effects
Head and neck	Painful swallowing Dry mouth Inflammation of the mucous membrane Disorders of smell Impaired taste	Ulcers Dry mouth Caries Bone radiation-induced necrosis Lockjaw Impaired taste
Chest	Difficulty swallowing	Fibrosis Narrowing Fistula
abdomen and pelvis	Nausea Vomiting Diarrhea Acute inflammation of the small and large intestine	ulcers Impaired absorption Diarrhea Chronic inflammation of the small and large intestine

One of the first symptoms after irradiation is the inflammation of the mucous membrane. According to reports from the World Health Organization (WHO), the frequency of these changes among patients treated with high-dose radiotherapy is almost 100% . Acute radiation-induced mucous membrane occurs already in the first days of irradiation therapy. The first symptom is erythema and the effect of ongoing inflammation is damage to the vascular endothelium. During the continuation of the treatment, the changes go into an ulcerative and bacterial phase, the symptom of which is swelling of the mucous membrane. The loss of vascular endothelial cells causes periodic bleeding, observed spontaneously or while eating food. The consequence of the reaction of the radiation-induced oral mucosa is discomfort while eating foods, especially hot and spicy foods. If there are problems with chewing and swallowing, it is necessary to modify the diet by introducing a liquid diet or enteral nutrition [5].

Dietary recommendations

Although many patients undergoing radiotherapy and / or chemotherapy may respond well to treatment, a very large percentage of side effects appear that have a significant impact on diet.. The most common side effects of chemotherapy are nausea and vomiting, which is

associated with the irritant effect of cytostatic drugs on the emetic center in the brain and / or on the gastric mucosa. Both the occurrence, and severity of nausea and vomiting during chemotherapy is different and in some patients it is not observed at all, others feel them throughout the course of treatment, and others only during drug administration. Nausea and vomiting worsen the patient's quality of life, discourage from taking food, when they are severe, they can cause serious water-electrolyte disturbances and serious deterioration of the general condition [2,6].

Radiotherapy is most often used as a supplementary method for the surgical treatment of cancer. Often, the irradiation is accompanied by eating disorders, disturbances of taste and smell, nausea, vomiting, diarrhea, problems with swallowing and dry mouth. The consequence of these disorders may be a smaller amount of food intake by the patient. Therefore, in order to prevent the development of malnutrition and cachexia and to protect cells from the adverse effects of surgery, we should strive to ensure adequate supply of nutrients [1,2]. Table no 3 presents dietary recommendations depending on possible side effects of radiotherapy.

Table no. 3 Dietary recommendations depending on the side effects of radiotherapy [1].

Radiotherapy exposed area	Side effects	Dietary recommendations
Throat, Mouth	Nausea	small meals, low fat content in the diet, avoiding products causing dyspeptic symptoms
	Vomiting	Parenteral nutrition
	Anorexia	Smaller by volume meals, attractive and accepted by the patient, possible support of the diet with enteral nutrition
	Decrease in the taste sensation	Emphasizing the aroma of food with spices
	Dental problems	Elimination of products with a high sugar content
	Mouth pain	Sparing diet, soft foods, pulpy diet or enteral nutrition through the probe
	Xerostomia	Avoiding dry products
	Problems with swallowing and drinking	Soft or semi-liquid dishes, small
The upper part of the abdominal cavity	Nausea and vomiting	Small volume of meals, low fat content
	Feeling of filling	Small meal volume, low fat diet,
	Reducing the secretion of digestive enzymes	Dietary products: easily digestible, moist, soft
Lower part of the abdominal cavity	Intestinal cramps	Sparing diet, small-bearing diet, soft
	Diarrhea dehydration	Low-stem diet, high fluid supply,
	Food intolerances	A lactose-free, low-fat diet containing MCT preparations, the supply of preparations for enetine nutrition

Summary

A patient with cancer is struggling with various ailments. Their severity, as well as coexistence, is observed not only in the advanced phase of the disease, but also during active anticancer treatment. The most common symptoms observed in the cancer population include fatigue, pain, insomnia, depression, anxiety, constipation, lack of appetite, wasting, nausea, vomiting, feeling of early saturation, shortness of breath, variability in the perception of taste, dry mouth [7]. Chemio and radiotherapy are the most commonly used methods of treatment outside cancer cells, healthy cells are also damaged, which is associated with the occurrence of side effects. Most of the complications lead to deterioration of nutritional status. For this reason, in all patients undergoing radio and chemotherapy, intensive nutritional counseling should be used for oral food supplements [6].

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