

# Nutritional intervention in a patient with advanced gastrointestinal cancer — a clinical case study

Interwencja żywieniowa u pacjenta z zaawansowanym nowotworem przewodu pokarmowego — stadium przypadku klinicznego

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## ABSTRACT

Malnutrition poses a significant challenge in the care of patients with cancer. Approximately 25% of individuals with accompanying malnutrition have a higher risk of complications and death during treatment. The decision regarding the method of nutrition is made individually, adapting it to the patient's current health status. Implementing nutritional treatment can substantially improve nutritional status and enhance the effectiveness of the applied therapy. In the article, the case of a 54-year-old patient with rectal adenocarcinoma NOS (low-grade adenocarcinoma NOS) cT3bN1bM1b with metastases to the liver and lungs is presented. The patient had undergone the laparoscopic procedure of a double-barrelled colostomy on the descending colon, and the initiation of nutritional treatment likely played a decisive role in her survival. The patient presented to the clinic in a moderately severe general condition (ECOG-3) with signs of malnutrition. In the interview, a weight loss of 18 kg over six months was observed (46 kg/155 cm, BMI 19.1 kg/m<sup>2</sup>). Laboratory tests at admission revealed elevated inflammatory markers, thrombocytosis, severe anaemia, and increased levels of tumour markers: Ca 19.9 > 10000.00 IU/mL, CEA 248.80 ng/mL. During hospitalization, parenteral nutrition was initiated, improving the overall condition, which allowed the patient to be qualified for treatment according to the FOLFOX-4 regimen at the appropriate doses. Treatment was continued in the specified regimen for 12 courses, improving the overall condition, weight gain, and decreased tumour markers.

**Key words:** clinical nutrition; nutritional assessment; malnutrition

## STRESZCZENIE

Niedożywienie stanowi poważne wyzwanie w opiece nad pacjentami z chorobą nowotworową. U około 25% osób z towarzyszącym niedożywieniem występuje większe ryzyko powikłań i śmierci podczas leczenia. Decyzja dotycząca sposobu żywienia jest podejmowana indywidualnie i dostosowana do aktualnego stanu zdrowia pacjenta. Wdrożenie leczenia żywieniowego może znacznie poprawić stan odżywienia i zwiększyć skuteczność stosowanej terapii. W artykule przedstawiono przypadek 54-letniej pacjentki z gruczolakorakiem odbytnicy NOS (gruczolakorak NOS o niskim stopniu złośliwości) cT3bN1bM1b z przerzutami do wątroby i płuc. Pacjentka została poddana laparoskopowemu wyłonieniu kolostomii dwulufowej na zstępnicy, a rozpoczęcie leczenia żywieniowego prawdopodobnie zadecydowało o jej przeżyciu. Pacjentka zgłosiła się do kliniki w stanie ogólnym ciężkim (ECOG-3) z objawami niedożywienia. W wywiadzie zaobserwowano

spadek masy ciała o 18 kg w ciągu 6 miesięcy (46 kg/155 cm, BMI 19,1 kg/m<sup>2</sup>). Przy przyjęciu na podstawie badań laboratoryjnych wykazano podwyższone markery stanu zapalnego, małopłytkowość, ciężką niedokrwistość i podwyższony poziom markerów nowotworowych: Ca 19,9 > 10000,00 IU/ml, CEA 248,80 ng/ml. W trakcie hospitalizacji rozpoczęto żywienie pozajelitowe, poprawiające stan ogólny, co pozwoliło na zakwalifikowanie pacjentki do leczenia według schematu FOLFOX-4 w dawkach należnych. Leczenie kontynuowano we wskazanym schemacie przez 12 cykli, uzyskując poprawę stanu ogólnego, wzrost masy ciała i spadek markerów nowotworowych.

**Słowa kluczowe:** ocena żywieniowa, żywienie kliniczne, niedożywienie

## INTRODUCTION

Malnutrition is a common issue among oncology patients, most frequently observed in the advanced stages of cancer. It often results in prolonged hospitalization, increased toxicity associated with systemic treatment, higher risk of infections, the necessity to reduce drug doses or RT doses, and, consequently, a diminished response to cancer therapy and a poorer prognosis. Malnutrition can also be a reason for discontinuation of oncological treatment or a direct cause of death. The prevalence of malnutrition depends on the type of cancer, disease advancement, treatment regimen, the patient's age and comorbidities. In cancer patients, malnutrition is associated with a systemic inflammatory response to tumour presence [1]. Patients with gastrointestinal cancers belong to a group with an increased risk of malnutrition; therefore, they should undergo special monitoring in this regard. Approximately 80% of patients with oesophageal cancer, 60% with gastric cancer, and 10–15% with colorectal cancer are malnourished [2]. Nutritional intervention has the potential to ameliorate the nutritional status of patients. In the last years (2015–2019), recommendations for nutritional treatment in oncology were published by The Polish Society of Oncologic Surgery (PTChO), the Polish Oncological Society (PTO), the Polish Society of Clinical Oncology (PTOK), and the Polish Society of Enteral, Parenteral, and Metabolic Nutrition (POLSPEN). The authors emphasized that the choice of nutritional treatment method primarily depends on the patient's clinical condition and requires an individual assessment [3].

In the article, a clinical case of a patient with cancer originating from the gastrointestinal tract is presented, where the initiation of nutritional treatment likely played a decisive role in her survival.

## CASE STUDY

A case is presented of a 54-year-old patient with rectal adenocarcinoma NOS (low-grade adenocarcinoma NOS) cT3bN1bM1b with metastases to the liver and lungs. She was diagnosed in April 2022. In June, the patient underwent laparoscopic creation of a double-barrelled colostomy on the descending colon. From January to June 2022, the patient's body weight loss reached 18 kg, 28% of her body weight. Due to the advanced stage of the disease and the patient's poor general condition, she was disqualified from adjuvant chemotherapy and referred to the Maria Skłodowska-Curie National Research Institute of Oncology

in Warsaw, Poland (MSCNRIO) for palliative radiotherapy with a pain-relief purpose. Severe life-threatening anaemia (Haemoglobin 4.8 g/dl) was observed in laboratory tests upon admission, and the patient was transferred to the Clinic of Oncologic Diagnostics, Cardio-oncology, and Palliative Medicine for blood transfusion. After stabilizing the general condition, planned radiotherapy was conducted using the VMAT+CBCT technique with X6 MV photons in 5 fractional doses of 500 cGy (totalling 2500 cGy), finished in July 2022. However, the patient was still weak and in poor general condition ECOG-3. Due to persistent pain and weight loss after palliative radiation, in July 2022, the patient was admitted to the hospital again to improve the condition and determine further treatment. At the admission, the patient was ECOG -3 scale, and her weight was 46 kg (BMI 19.1 kg/m<sup>2</sup>). Laboratory tests revealed AIDA (absolute iron deficiency anaemia), folic acid deficiency, and high levels of tumour markers (Table 1). The patient was qualified for nutritional treatment using parenteral nutrition via the central catheter and orally — FSMP (Food for Special Medical Purposes). The patient's requirement for macro- and micronutrients was calculated to be 1380 kcal. The needs for energy and protein were covered with the complete parenteral nutritional mixture (total energy 1100kcal) and one package of high-protein FSMP (total energy 300kcal). After one week of treatment, general conditions and laboratory parameters were improved. The patient was qualified for systemic treatment at appropriate doses according to the FOLFOX-4 regimen. After the first course, the neutropenia grade 3, non-symptomatic, occurred, and systemic treatment was continued with reduced doses to 85%. Unfortunately, after the second course of systemic treatment, a sub-ileus appeared. No indication for surgical intervention was found. Due to abdominal pain, nausea and poor oral intake, the parenteral nutrition was reintroduced using the venal port and complete, all-in-one mixture (1184 kcal, increased in the following days to 1475 kcal, with the addition of micronutrients covering 100% RDI/AI). Again, clinical and laboratory improvement was achieved. Dietary counselling and high-protein complete FSMP were prescribed as support (2 packages, 600 kcal and 40 g of protein), with acceptable compliance. Additionally, before the third course of chemotherapy, the PCR test confirmed the SARS-CoV-2 infection. There were no signs of respiratory insufficiency, only mild, influenza-like symptoms. The patient was treated with molnupiravir. The patient fully

**Table 1.** Case study. Laboratory tests findings

| Timeline                   | After palliative radiotherapy<br>(July 2022) | After 8 courses<br>FOLFOX4<br>(December 2022) | After 12 courses FOLFOX4<br>(February 2023) |
|----------------------------|----------------------------------------------|-----------------------------------------------|---------------------------------------------|
| WBC [g/L]                  | 10.63                                        | 6.63                                          | 6.66                                        |
| Hb [g/dL]                  | 8.40                                         | 10.80                                         | 11.90                                       |
| PLT [G/L]                  | 554                                          | 202                                           | 228                                         |
| CRP [mg/L]                 | 202.10                                       | 17.10                                         | 4.50                                        |
| Prealbumin [mg/mL]         | 12.13                                        | 23.33                                         | 17.99                                       |
| Chlorides [mmol/L]         | 96.30                                        | 100.60                                        |                                             |
| Albumin [g/L]              | 32.90                                        | 34.80                                         | 33.50                                       |
| Sodium [mmol/L]            | 130.40                                       | 138.90                                        | 136.80                                      |
| Potassium [mmol/L]         | 3.83                                         | 4.31                                          | 4.03                                        |
| Calcium corrected [mmol/L] | 2.34                                         | 2.43                                          | 2.28                                        |
| Iron [µmol/L]              | 2.10                                         | 9.00                                          | 10.30                                       |
| Ferritin [ng/mL]           | 58.87                                        | 472.30                                        | 944.40                                      |
| Transferrin saturation [%] | 16.76                                        | 14.35                                         | 16.67                                       |
| Transferrin [g/L]          | 2.49                                         | 2.52                                          | 2.46                                        |
| Folic acid [ng/mL]         | 3.56                                         | > 40.00                                       | 27.04                                       |
| Vitamin B12 [pg/mL]        | 1082.00                                      | 570.80                                        | 680.60                                      |
| Ca 19.9 [IU/mL]            | > 10000.00                                   | 161.20                                        | 171.90                                      |
| CEA [ng/mL]                | 293.00                                       | 8.67                                          | 9.81                                        |

WBC — white blood cell; Hb — haemoglobin; PLT — platelets; CRP — C-reactive protein; CEA — carcinoembryonic antigen

recovered and continued the FOLFOX-4 regimen. Regular consultations with the dietitian were conducted before each course of chemotherapy to assess the nutritional status and adjust the diet and FSMP. After eight courses in December 2022, a computed tomography (CT) scan was performed, describing partial regression of the disease. A decrease in tumour markers was also observed, data presented in Table 1. The patient completed 12 courses of the first line of chemotherapy, FOLFOX-4. Due to neuro- and haemotoxicity, the regimen was deescalated from FOLFOX-4 to LVUV (fluoropyrimidine alone, no oxaliplatin). The following CT scan from March 2023, after 12 courses, confirms a profound response. Despite the de-escalation of systemic treatment, the toxicity was not acceptable for the patient, and the treatment was discontinued. In June 2023, one year after diagnosis, a whole-body CT scan confirmed multifocal progression of the primary disease. However, the nutritional status of patients was stable (no further weight loss, no need for artificial nutrition), as well as their performance status (ECOG-2). After a Multidisciplinary Team consultation, the patient was offered the second line of systemic treatment according to the FOLFIRI regimen. The patient started the second-line treatment at the end of June 2023. After the first course, she developed sepsis of *Escherichia coli* aetiology. Antibiotic therapy and symptomatic treatment were applied, achieving slight improvement. Despite the treatment, the patient's status was unsatisfactory (ECOG-3). The patient was disqualified from oncological treatment and referred to hospice care.

## DISCUSSION

Nutritional treatment plays a pivotal role in the care of patients with cancer. It is estimated that 20% of cancer patients die due to consequences of malnutrition rather than

the progression of the cancer disease [4, 5]. The significance of proper nutrition as support in oncological treatment has been confirmed by numerous scientific studies analysing the impact of nutrition on disease progression and therapy effectiveness. Unquestionably, weight loss is associated with poorer prognosis and increased risks of complications from the applied therapy [6]. Although an increase in the patient's body weight was not observed, it does not indicate that the nutritional intervention was ineffective or pointless. The applied nutritional intervention significantly improved the patient's performance status, positively impacted her well-being, and reduced pain symptoms, enabling independent daily functioning. Maintaining oral nutrition ability is pivotal for mental health and social relationships. Patients with access to nutritional counselling and care often experience improved quality of life, like in the discussed patient's case. Patients with gastrointestinal cancers are at high risk of malnutrition, and malnutrition is associated with a worse prognosis. A study by Ravasco et al. compared three groups of colorectal cancer patients, demonstrating that individualized nutritional counselling, education, monitoring, and timely dietary management positively influence quality of life, disease progression, treatment complications, and mortality [5]. Nutritional deterioration decreases life quality and life expectancy [7, 8]. The meticulous nutritional status assessment, individualized nutritional approach, nutritional treatment plan, and decisions made by the multidisciplinary nutritional team are significant steps in enhancing therapy effectiveness [4]. However, it is essential to evaluate the benefit of nutritional support in patients with advanced cancer. The introduction of parenteral nutrition should be carefully considered, and all relevant aspects should be considered, including the cancer prognosis. Patients undergoing oncologic treatment

with rapidly progressing disease and an ECOG performance status of  $\geq 3$  have a lower likelihood of benefiting from nutritional support [9]. Nutritional support seems to be a window of opportunity, especially in patient groups with transient problems which may be effectively reversed. In the study patient's case, supportive care regimens like blood transfusion, pain treatment, rehabilitation and nutrition were implemented. Improving the patient's nutritional status, even in such a severe condition, allowed us to implement appropriate cancer treatment, undoubtedly extending her survival. According to the American Cancer Society, the 5-year survival rate in colorectal cancer stage IV (metastatic disease) is only 13%. Survival in disseminated disease without oncological treatment is less than 6 months [10]. The patient lived a year with temporary regression of the disease and with an acceptable quality of life.

### CONCLUSIONS

Nutrition is a crucial element of oncological treatment. It has a tremendous impact on the quality of life and the course of treatment for patients with cancer. Nutritional treatment should be implemented comprehensively and on an individualized basis.

#### Article information

**Data availability statement:** CGM Clininet database.

**Ethics statement:** The study is performed according to the data protection and bioethics of the Polish law.

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**Conflict of interest:** None declared

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