Nutritional treatment

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According to the authors and editors, this report contains the most justified principles of diagnostic and therapeutic procedures prepared considering the scientific value of evidence and category of recommendations. These principles should always be interpreted in the context of an individual clinical situation. The recommendations do not always correspond to the current reimbursement rules in Poland. In case of doubt, the current possibilities of reimbursement of individual procedures should be established.

1. The quality of scientific evidence
I — Scientific evidence obtained from well-designed and conducted randomized clinical trials or meta-analyses of randomized clinical trials
II — Scientific evidence obtained from well-designed and conducted prospective observational studies (non-randomized cohort studies)
III — Scientific evidence obtained from retrospective observational studies or case-control studies
IV — Scientific evidence obtained from clinical experiences and/or experts, opinions
2. Category of recommendations
A — Indications confirmed unambiguously and absolutely useful in clinical practice
B — Indications probable and potentially useful indications in clinical practice
C — Indications determined individually

Definitions

Cachexia/anorexia syndrome (or cancer cachexia), also referred to as CAC (cancer anorexia/cachexia syndrome), is a set of symptoms characterised by severe, long-lasting, unintended, and progressive weight loss that responds to a small extent to conventional nutritional treatment and may be associated with anorexia, asthaenia, and feeling of early fullness [1, 2]. It occurs in over 75% of cancer patients in various stages of the disease.

Cachexia is defined as a set of disorders including [3]:
— persistent loss of lean body mass;
— no complete response to nutritional treatment;
— gradual deterioration of performance status.

One of the first symptoms of cachexia/anorexia syndrome in cancer patients is anorexia, with varying

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degrees of severity and at different rates of development. Initially, patients report disturbances in taste and smell, forcing a change in diet and eating habits. In the next stages of anorexia intensity, a gradual or sudden reduction in the amount of food consumed, and a feeling of rapid satiation and nausea can occur. In oncological patients, anorexia is not associated with psychiatric disorders and is based on the cancer lesions described below. Cachexia following anorexia, together with the mechanisms of metabolic and immune changes induced by the tumour, creates a cause and effect relationship.

According to the guidelines established during the EAPC (European Association for Palliative Care) conference, cachexia is diagnosed in the case of:
— weight loss ≥ 5% in six months or
— weight loss > 2% in six months if BMI < 20 kg/m^2 or
— weight loss > 2% with ALM Index (appendicular lean mass) reduction.

It should be remembered that cachexia can develop from the onset of cancer, often even preceding the diagnosis. Approximately 50% of oncologic patients demonstrate symptoms of cachexia at diagnosis. Antineoplastic treatment — surgery, chemotherapy, radiotherapy, modern targeted drugs — is also associated with weight loss. However, this symptom should not be perceived as a natural consequence of oncological treatment if appetite disorders, change in taste and smell, and asthenia are concomitantly observed along with body weight loss.

Unfortunately, despite the knowledge that cachexia/anorexia syndrome develops from the onset of cancer, the diagnosis is significantly delayed, which affects the therapeutic effects of the oncological treatment itself. In analysis carried out by Góraj [4], the time between cancer diagnosis and cachexia diagnosis was on average 18 months (15.5 months in women and 22.2 months in men).

There are many causes of cachexia/anorexia syndrome, and the most important are the following:
— eating disorders (mechanical obstruction, loss of appetite);
— intensification of metabolic and catabolic processes;
— increasing nutrient loss;
— nutrient malabsorption;
— intensification of inflammatory response (e.g. due to activity of pro-inflammatory cytokines);
— nutrient *requirement increase;*
— side effects of anticancer treatment (taste disturbances, loss of appetite, nausea, vomiting, diarrhoea).

At the cellular level cachexia is primarily due to the pathological neuroendocrine stress response (insufficient activity of anabolic hormones and/or excessive catabolic activity), as well as dysregulation of the autonomic nervous system (activation of the sympathetic nervous system) [1].

Table 1. Metabolic disorders in cancer patients

Carbohydrates
— increased gluconeogenesis from amino acids, lactates, and glycerol
— increased glucose uptake and turnover
— insulin resistance
Lipids
— increased lipolysis
— increased turnover of glycerol and fatty acids
— fat oxidation not inhibited by glucose
— reduced lipogenesis
— decreased lipoprotein lipase activity
— unstable increase of NEFA (non-esterified fatty acids) serum level
— unstable increase of serum fats
Proteins
— increased catabolism of muscle proteins
— increased total protein turnover
— increased protein synthesis in the liver
— reduced muscle protein synthesis

Grabiec et al. [5] emphasise that in cachexia there are always significant changes in metabolism, consisting of the increase in energy expenditure at rest and disturbances in carbohydrate, protein, and lipid metabolism (Table 1).

It is very important to recognise the difference between simple starvation, with no connection to cancer, and cancer cachexia, including systemic disorders and the malnutrition occurring simultaneously. The clinical implications of this fact are significant: without reducing the severity of cachexia (i.e. without treating cancer or reducing its symptoms), it is impossible to improve the nutritional status.

Consequences of cachexia/cancer anorexia syndrome

Cancer cachexia has very serious clinical consequences, which are classified as primary and secondary. The primary ones include:
— weight loss;
— decreased protein concentration: muscle weakness, immunity impairment;
— atrophy of respiratory muscles, worsening of ventilation efficiency (atelectasis, hypoxia, pneumonia);
— atrophy of intestinal villi, weak intestinal motility — digestive disorders and malabsorption;
— disorders of water and electrolyte balance;

— anaemia, coagulation disorders;
— bradycardia, decreased myocardial contractility;
— osteoporosis.

Weight loss before chemotherapy commencement increases the number of complications, and reduces treatment time without side effects, response rate, and the patient's quality of life [6, 7]. Weight loss has been shown to be a poor prognostic factor in patients with prostate, colorectal and lung cancer. Although the patients who lost the weight received lower initial doses of cytostatics, more severe side effects have been more frequently reported in this population, and chemotherapy was shortened on average by one month [7].

Similar observations have been made by Berlaz et al. [8]. These authors found that the body mass index (BMI) is a prognostic factor in patients with operable breast cancer [8]. The same was concluded for colon cancer patients [9].

For clinicians the secondary complications are particularly important: increased frequency of infections, wound healing disorders (evisceration, anastomotic leakage), prolongation of hospital stay and increase of treatment costs [1]. Secondary complications additionally include intensification and increased frequency of infections, depression, anxiety, increased antisocial behaviour, isolation of patients, and ultimately discontinuation of treatment.

The consequences of cachexia are particularly noticeable during anticancer treatment. It disturbs significantly the tolerance of anticancer treatment and increases nausea and vomiting, mucosal reactions, and risk of complications. This applies to both chemotherapy and radiation therapy because 66% of patients after chemotherapy and radiotherapy experience weight loss [10, 11].

It should be remembered that at least 50% of patients with advanced cancer experience severe cachectic disorders, and 10% die only for this reason [12].

Treatment

Because cancer cachexia/anorexia syndrome encompasses a combination of different factors the treatment is not easy; however, effective intervention is possible. In a study by Temel et al. [13] it was found that multifactorial therapy in patients with non-small cell lung cancer resulted in prolongation of survival time by an average of two months (11.6 *vs.* 8.9 months, p = 0.02).

Medical interventions in cachexia/anorexia syndrome should consist of three aspects [14]:
— ensuring physical activity;
— reducing inflammation severity;
— ensuring correct supply of nutrients.

Physical exercises allow restoration of anabolic processes in muscles, reduce the catabolic effect of cachexia, and decrease inflammation severity [14]. Encouraging patients to undertake such activities is not easy, but this should not be the reason for not doing so [15].

Reduction of inflammation can be achieved not only by the aforementioned physical activity, but also by using anti-inflammatory drugs and substances; among them is the largest group of non-steroidal anti-inflammatory drugs (NSAIDs). In one of the current meta-analyses it has been shown that they are not only effective in the basic aspect of their action, but also can prevent weight loss [16–18].

Undoubtedly the most important aspect of cancer cachexia/anorexia syndrome management is to ensure the correct supply of nutrients. This supply may be impaired due to increased requirements related to increased metabolic rate, increased weight loss, or most importantly, reduced food intake. The latter is an effect of secondary anorexia, which in turn is caused by predominance of signals suppressing appetite in the hypothalamus, such as the release of proopiomelanocortin and anorexigenic action of pro-inflammatory cytokines (IL-1α, IL-1β, IL-6, TNF-α) [5].

Ensuring correct supply of nutrients

General principles of nutritional treatment

Proper nutritional intervention should consist of the following elements:
— evaluation of nutritional status and type of disorders;
— assessment of indications for treatment and nutritional requirements;
— defining the route of intervention (enteral, intravenous, or mixed);
— preparation of a nutrition program;
— proper supply of nutrients;
— monitoring treatment course and results.

Evaluation of nutritional status

Nutritional status is evaluated to identify patients who are malnourished or at risk of malnutrition, to determine the type and severity of malnutrition, and to monitor the effectiveness of nutritional treatment.

Usually this is made based on the following:
— nutritional history and anthropometric measurements (current weight, unintentional weight loss; BMI, arm circumference, skinfold thickness over the triceps muscle, handgrip strength test, bioimpedance);
— biochemical tests [serum concentration of albumin, prealbumin, transferrin, total lymphocyte count (TLC)];
— screening scale (e.g. Mini Nutritional Assessment, Malnutrition Universal Screening Tool — MUST,

Nutritional Risk Screening 2002 — NRS 2002 and Subjective Global Assessment — SGA)

Scale NRS 2002 and SGA are mandatory in Poland in accordance with the Regulation of the Minister of Health of September 15, 2011) — with one of them one should assess the nutritional status of each patient when admitted to the hospital (not applicable to the Hospital Emergency Department).

Nutritional treatment

Nutritional treatment (clinical nutrition) is a medical procedure including assessment of nutritional status and nutrient needs, commissioning and administration of appropriate doses of energy, protein, electrolytes, vitamins, trace elements, and water in the form of normal nutritional products, liquid oral diets, or artificial nutrition, monitoring clinical condition, and ensuring optimal use of the selected feeding route. It is an integral part of therapy, consisting of supply, via parenteral or enteral (or both) route, of the energy substrates and nitrogen in amounts that cover the current needs of patients who cannot eat normally or feed inadequately.

Indications for nutritional treatment:

— expected inability to introduce an oral diet for more than seven days even if the patient is in good nutritional status;
— current malnutrition [regardless of its type: simple malnutrition, disease-related (cachexia), sarcopenia];
— inability to maintain daily food intake > 60% of recommended dose for more than 10 days.

In adults, malnutrition is diagnosed if at least one of the following criteria is met:

1. BMI < 18.5 kg/m^2
2. Weight loss (unintentional) > 10% (regardless of time) or > 5% in the last three months and one of the following:

— BMI < 20 kg/m^2 if age < 70 years or BMI < 22 kg/m^2 if age > 70 or
— fat free mass index (FFMI) < 15 (F) or < 17 (M) kg/m^2.

Other parameters, such as: concentration of albumin < 3.0 g/dl; prealbumin < 10.0 mg/dl; transferrin < 150 mg/dl; TLC < 1000/mm^3, indicate high nutritional risk and have prognostic and rather than auxiliary value.

It should be highlighted that there is no reliable clinical data indicating the risk of tumour growth acceleration and disease progression due to the use of nutritional treatment. It is also known that fasting does not inhibit cancer development, but significantly worsens the patient's condition — as a result, death due to malnutrition can occur faster than due to cancer itself.

Nutrient requirements

Protein supply in adult with cancer should amount to 1.2–2.0 g/kg bw/day, and energy supply 25–30 kcal/kg bw/day. Calculation should be made based on actual body weight for properly fed or malnourished patients and on ideal body weight for obese patients.

Nutritional treatment should be complete and contain all necessary ingredients (amino acids, carbohydrates, fats, electrolytes, trace elements, vitamins — retinol, calciferol, tocopherol, vitamin K, thiamine, riboflavin, pyridoxine, vitamin B_{12}, pantothenic acid, folic acid, niacin, ascorbic acid, and water).

The components of correct diet, i.e. electrolytes, vitamins, and trace elements, should be given in amounts covering the daily requirements (RDA, recommended daily allowance). Increased amounts of micronutrients are not permitted unless there is documented deficiency or a clinical situation that will definitely cause such a deficiency, for example vitamin B_{12} deficiency after total gastrectomy.

The optimal method of nutritional treatment is chosen through analysis of the following:

— patient clinical status;
— severity and type of malnutrition;
— planned duration of nutritional treatment;
— type and purpose of therapy: surgical treatment, chemotherapy, radiotherapy, targeted drugs with radical or palliative intention.

It is believed that the method of choice is feeding through the gastrointestinal tract (enteral nutrition), which includes:

— supply via the oral route (including: enriching the diet, or food fortification);
— use of liquid oral dietary supplements (sip feeding);
— feeding to the stomach (through a tube or fistula, gastrostomy);
— feeding to the small intestine (through a tube or fistula, jejunostomy).

Enteral nutrition is always preferable to parenteral nutrition, unless there are contraindications, which may be: intestinal obstruction (ileus) (paralytic or mechanical); severe shock; intestinal ischaemia; unrelenting diarrhoea or vomiting; abnormal absorption across the gastrointestinal tract or gastrointestinal fistula (malabsorption) without the possibility of using a section of the intestine located below the fistula to a sufficient extent.

The type of intervention should be chosen as follows:

A. Oral diet:
1. Nutritional counselling — in the first place,
2. Oral nutritional supplements (ONS) — as part of counselling or separate intervention;

B. Artificial nutrition:
1. Enteral (i.e. through gastrointestinal tract, or with use a feeding tube/fistula),

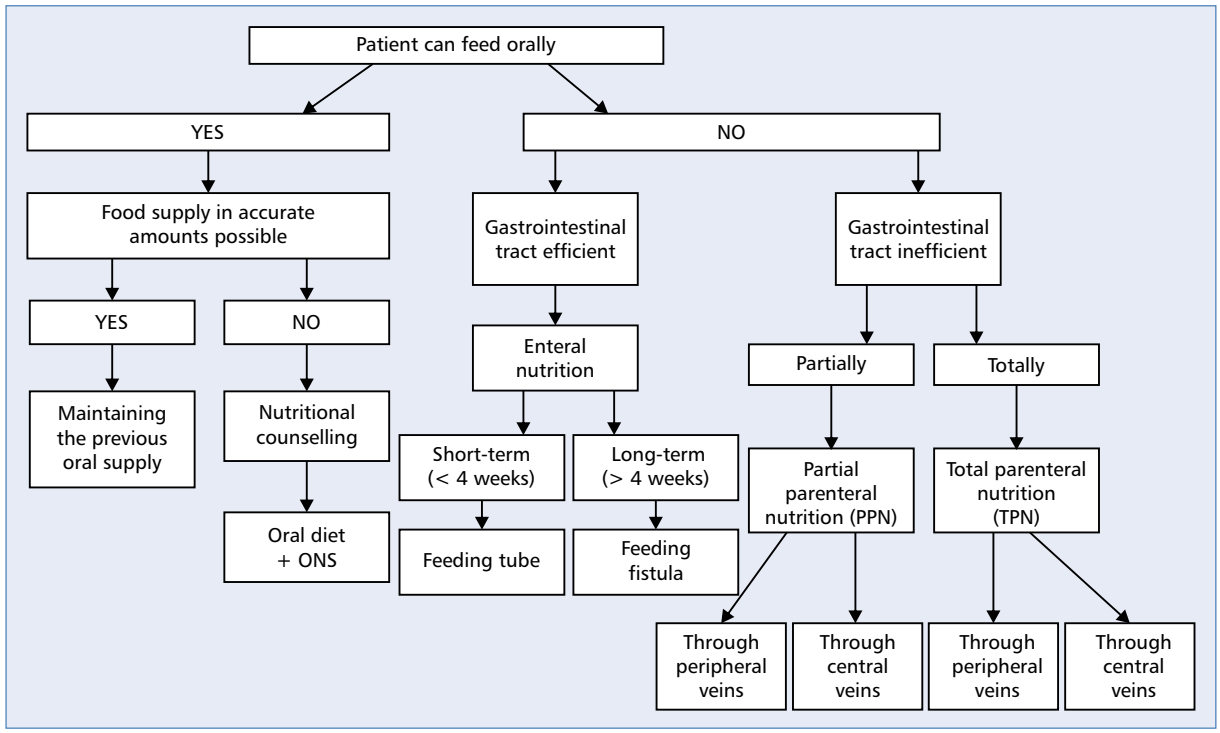

Figure 1. The algorithm of selecting nutritional intervention. ONS — oral nutritional supplements

2. Parenteral (intravenous),
3. Combined (enteral and parenteral).

Nutritional counselling

Nutritional counselling should be considered at every stage of cancer patient treatment. It should be done as soon as possible, ideally shortly after cancer diagnosis, to maintain normal body mass and prevent malnutrition. All activities should be adapted to the type and stage of cancer and treatment used.

Most patients can receive easily digestible balanced food, with a caloric content of 25–30 kcal/kg bw/day. However, some patients may require the supply of a lactose-free or low-fat diet or certain restrictions, such as limited supply of insoluble fibre, simple sugars, or supplementation of various active compounds, depending on medical indications. Patients with chronic diarrhoea may benefit from modifications of the BRAT diet (under-ripe bananas, white rice, applesauce, wheat toasts) or low-FODMAP (so-called fermented short-chain saccharides) diet. It should be emphasised that the indications for restriction diets, determining the proper balance of protein and energy in an oral diet, should be assessed by a suitably qualified dietitian. The patient should also be informed about the risk of using unbalanced alternative diets (Gerson's diet, Budwig diet, ketogenic diets, fasting diets), alternative supplements (e.g. amygdalin, high doses of vitamin C) because it may contribute to deterioration of nutritional status, development of numerous complications, and consequently postponing or terminating the therapy. A dietitian should be employed in every hospital dealing with the treatment of oncological patients.

At any stage of treatment, oral food supplements (liquid oral dietary supplements, ONS — oral nutritional supplements) may be useful. The main advantage is their composition and small volume, which in patients with considerably reduced appetite may be a way to supplement the appropriate amounts of nutrients.

ONSs are food for special medical purposes for use under medical supervision; the basic indications for their use in patients with efficient swallowing reflex is malnutrition and risk of its development. ONSs and enteral *dietary* supplements are made of high-quality natural products, they are clinically free of lactose and purines, and do not contain cholesterol and gluten. Contrary to enteral supplements, ONSs contain flavour additives and a significantly reduced amount of water.

Both ONS and enteral diets available on the market differ in composition, purpose, and form. Only selection of a preparation suitable for the patient's health problem, considering the current state of their gastrointestinal tract, guarantees achieving the intended goal of nutritional support for a malnourished patient or one threatened with undernutrition.

Table 2. Frequently reported complaints and basic dietary advice

Complaint	Nutritional advice
Nausea and vomiting	Proper hydration should start 2–3 days before chemotherapy, fluids with ginger, ice cubes, Coca-Cola, avoiding mint Small and frequent, cold meals Delicate dishes: milk-fruit cocktails, soups, mousses, jelly, pancakes, scrambled eggs, ONS supplement Elimination of heavy, fried products with a high content of fibre
Diarrhoea	Modification of the BRAT diet (bananas, rice, applesauce, toast) Low-FODMAP diet In some cases, elimination of lactose (chemotherapy regimens containing 5-FU, irinotecan, capecitabine) Probiotics, oral electrolyte solutions Brewing blueberries, natural cocoa in water
Constipation	After regulating constipation (pharmacological, mechanical), introduction of a diet with an increased content of fibre (soluble and insoluble) and adequate hydration Natural sorbitol from plums, pears, birch sugar Natural silage
Anorexia, disorders of smell and taste	Recommendations as for nausea and vomiting, plus: — marinating meat products in apple mousse before thermal treatment — high-energy ONS with the lowest possible volume — increasing amounts of easily digestible fats in the diet (butter and fatty dairy products)

Table 3. Sources of nutrients in ONS and enteral nutrition (EN) formulas

Component	
Protein	Casein and whey protein fractions of cow's milk, soy and pea protein, ovalbumin from eggs, gelatine (collagen hydrolysate), amino acids derived from meat, e.g. chicken, addition of single amino acids, e.g. lysine, branched-chain amino acids, glutamine, arginine
Carbohydrates	Polysaccharides and maltodextrins mainly from maize
Fat	Most vegetable oils available on the market: sunflower, soybean, coconut, corn, grape, safflower, rapeseed, olive oil, and fish oil
Fibre	Different fractions, 6 basic: cellulose, inulin, fructooligosaccharides, digestive-resistant starch, soy polysaccharides, gum arabic
Micronutrients	Addition of vitamins, minerals, and trace elements

There are several classifications of oral dietary supplements:

1. According to the completeness of the composition:
— complete: containing all macro- and micro-components,
— incomplete: containing one or more ingredients;
2. According to caloricity:
— hypocaloric < 1 kcal/mL; usually 0.5–0.6 kcal/mL,
— isocaloric app. 1 kcal/mL; usually 0.9–1.2 kcal/mL,
— hypercaloric > 1 kcal/mL; usually 1.3–2.4 kcal/mL;
3. According to protein and energy content:
— high-energy; increased fat content > 30%,
— high-protein; increased protein content 20–25% and app. 7–8 g of protein per 100 mL of supplement,
— mixed;
4. According to protein hydrolysis degree:
— polymeric; whole protein molecules,
— oligomeric (peptide); short peptide chains up to 50 amino acids,
— monomeric (elementary); single amino acids;
5. According to using:
— diets dedicated to specific diseases (diabetes, kidney, liver, respiratory diseases, etc.) or to specific clinical situations such as malabsorption syndrome, immunosuppression, dysphagia, preparation for surgery, and others.

Depending on the individual clinical situation in cancer patients, all types of ONS can be used, not only those dedicated to neoplastic disease.

Improvement of quality of life through the impact of nutrition on gastrointestinal symptoms and anorexia is crucial at every stage of oncological treatment, but the intervention during active anticancer treatment is particularly important. In this phase patients usually require an easily digested diet with a proper texture, which is tasty (flavoured according to the patient's preference) and varied, sometimes in semi-liquid or blended form (e.g. cream soup, milkshakes, mousses, and purees from fruits, vegetables, and meat, with the addition of ONS).

Patients whose treatment has been terminated and who have suffered permanent functional impairment of systems and organs (e.g. patients with colostomy or ileostomy, dysphagia and chewing disturbances after head and neck and oesophagus cancer treatment, extensive gastrointestinal resections, chronic intestinal inflammation after irradiation or malabsorption syndromes) may require a special menu, and some may require nutritional care for years after treatment, sometimes for life.

Stimulation of appetite

In some patients increasing the protein and energy supply alone is not sufficient due to significant anorexia, and nutritional counselling and dietary supplementation are ineffective; only pharmacological treatment of anorexia/cachexia improves the possibility of receiving regular food and/or dietary supplements.

The classic drug stimulating the appetite, which effectively allows alleviation of cancer cachexia is megestrol acetate (MGA). The mechanism of action of this drug is based on inhibition of proinflammatory cytokines, mainly IL-1 and tumour necrosis factor (TNF) [2], ultimately leading to reduced concentration of inflammation markers [19].

The main effects of MGA include [2]:
— stimulation of appetite resulting in appetite improvement in 70% of patients and increase in the amount of food consumed by more than 30%;
— increase body weight and body fat percentage;
— improvement in well-being;
— fatigue reduction.

In the majority of patients the best MGA result is noticeable after approximately 4–6 weeks of treatment with recommended doses [2].

The effect of megestrol acetate can be enhanced by its combination with concomitant administration of NSAIDs (diclofenac, ibuprofen). Such a combination showed very good results in patients with gastrointestinal and head and neck cancers [21, 22].

In addition, preservation of adipose tissue due to MGA administration plays a protective role regarding degraded muscle tissue (e.g. reduces the proteolysis of muscle fibrils).

Concluding, MGA is a valuable drug stimulating the appetite in appropriately selected groups of patients, considering contraindications to its.

According to ESPEN 2017 recommendations, drugs recommended for the treatment of cachexia are as follow: megestrol acetate (strength of recommendation — weak, level of evidence — high), glucocorticosteroids (strength of recommendation — weak, level of evidence — high), essential fatty acids (EFAs) from the omega-3 family (strength of recommendation — weak, level of evidence — low). Other groups of drugs such as cannabinoids, androgens, including selective androgen receptor modulators (SARMs), NSAIDs, amino acids, and ghrelin agonists are not recommended for the treatment of cachexia, and the level of evidence is rated as low.

Artificial enteral nutrition (feeding tube or fistula)

In the case of no possibility to use the most physiological route (oral), artificial enteral nutrition should be employed (feeding tube or fistula).

If enteral nutrition is planned for up to four weeks, use of a feeding tube is sufficient. However, if planned nutrition time exceeds four weeks, a feeding fistula (gastro- or jejunostomy) should be created. In the case of gastrostomy polymeric standard diets can be used, while in patients with jejunostomy only oligomeric diets are recommended.

The blenderized food is no longer used in artificial enteral nutrition. This is due to the fact that oral nutritional supplements are very precisely composed and contain all needed ingredients, and the NHF reimbursement is widely available.

Parenteral nutrition (intravenous)

If there is no possibility to apply nutritional therapy via the gastrointestinal tract, an intravenous route should be used. Parenteral nutrition may be the only way to provide nutrients (e.g. total parenteral nutrition, TPN) or an add-on to enteral nutrition or oral diet (e.g. partial parenteral nutrition, PPN).

Parenteral nutrition can be carried out using:
— a catheter whose tip is located in a central vein — so-called parenteral nutrition via central veins;
— a cannula inserted into the peripheral vein (parenteral nutrition via peripheral veins);
— arteriovenous fistula;
— a vascular port implanted under chest skin (totally implantable devices, TIDs).

During parenteral nutrition the "All-in-One" method should be used (e.g. all nutrients mixed in one bag). It allows the supply of all ingredients mixed in one container at the same time. One-bag feeding can be carried out using mixtures prepared in hospital departments by mixing all semi-preparations, mixtures prepared in hospital pharmacies in mixer technology or using multi-chamber bags (MCBs) (two- or three-chamber bags).

Nutritional treatment in patients in palliative care

If effective anti-cancer treatment is not possible, the patient should be provided with proper palliative care. It is aimed to relieve symptoms and improve quality

of life, and nutritional treatment comprises one of the elements of such care.

Nutritional treatment should be carried out as long as the patient gives consent and until the dying phase has begun. The intervention of choice is dietary counselling with ONS use and together with enteral nutrition; however, in some cases parenteral nutrition is also used. From a practical point of view, it is important to distinguish the palliative phase of the disease, which can last many months or even years, as opposed to the terminal phase of the disease, which lasts at most days or weeks. According to the ESPEN 2017 recommendations the principles of qualifying patients for nutritional treatment in palliative care are the same as for patients treated with intention to cure. In turn, the management of patients in the terminal phase of disease should be based on the simplest and least invasive procedure — preferably small amounts of oral foods and ONS. The dying phase, i.e. the hours or days preceding the patient's death, is a contraindication to artificial feeding. In this phase small amounts of fluids administered orally or subcutaneously would suffice. However, before the terminal phase the patient may be a candidate for parenteral nutrition at home. In practice, the most common indications for parenteral nutrition are: adhesive disease and multi-level gastrointestinal obstruction with no possibilities of surgical treatment (most commonly gynaecological malignancies or peritoneal cancer dissemination, e.g. carcinomatosis), extreme cachexia and anorexia, short bowel syndrome, end jejunostomy syndrome, and head and neck cancer making it impossible to obtain enteral access for nutrition.

The use of corticosteroids and progestogens may be helpful to increase appetite, modify metabolic disorders, and prevent deterioration of quality of life.

Total home parenteral nutrition of patients in incurable stages of cancer remains a contentious issue. Neoplastic diseases are the most common indication for home nutritional treatment worldwide (app. 40%), although there are significant differences between countries. In Poland patients with cancers, especially in their advanced stage, are very rarely qualified for home nutritional treatment.

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Appendix

Nutritional Risk Screening 2002 — preliminary screening

	Question	Yes	No
1	BMI < 20.5		
2	Weight loss in the last 3 months		
3	Reduced food intake during the last week		
4	Is the patient critically ill? (e.g. is hospitalised in an intensive care unit, ICU)		

Yes — in the case of an affirmative answer to at least one question, it is necessary to perform the next screening stage using the second part of the NRS 2002
No — if the answer to all questions is "no", the screening should be repeated after one week

Nutritional Risk Screening 2002

Deterioration of nutritional status		**Severity of disease (= increased nutrient requirements)**	
0 points: no malnutrition	Correct nutritional status	0 points: no	Normal nutrients requirements
1 point: mild malnutrition	Weight loss > 5% within 3 months or food intake < 50–75% of requirements during last week	1 point: mild malnutrition	Femur fracture Chronic diseases with acute complications: liver cirrhosis, COPD, chronic haemodialysis, diabetes, neoplastic diseases
2 points: moderate malnutrition	Weight loss > 5% within 2 months or BMI 18.5–20.5 with accompanying deterioration of general state or food intake within 25–60% of normal requirement in last week	2 points: moderate malnutrition	Large abdominal operations, stroke, severe pneumonia, malignant haematological diseases
3 points: severe malnutrition	Weight loss > 5% within 1 month (> 15% within 3 months) or BMI < 18.5 with accompanying deterioration of general state or food intake within 0–25% of normal requirement in last week	3 points: severe malnutrition	Head injury, bone marrow transplantation, patients requiring intensive therapy (assessment according to APACHE scoring system > 10 points)
In total: ..... points		**In total: ..... points**	
Age		**If the patient is > 70 years of age, add 1 point to the total number of points**	
TOTAL NUMBER OF POINTS: ...			
Total number of point ≥ 3 indicates the risk of malnutrition and the need to start nutritional support (treatment) **Total number of point < 3 indicates that screening should be repeated after a week**			

SUBJECTIVE GLOBAL ASSESSMENT (SGA)

I. Medical history

1. Age (years) ……. **Height** (cm) ……. **Weight** (kg) …… **Sex** □ F □M

2. Changes in body weight Weight loss in last 6 months …… (kg) ……..(%)
Change of body weight in last 2 weeks:
□ Increase □ No change □ Decrease

3. Changes in food intake

□ No changes □ Changes: duration …….. (weeks)

Type of diet:

□ similar to the optimal diet based on solid foods

□ complete liquid diet

□ hypocaloric liquid diet

□ starvation

4. Gastrointestinal symptoms (lasting over 2 weeks)

□ No symptoms □ Nausea □ Vomitus □ Diarrhoea □ Anorexia

5. Physical efficiency

□ No changes □ Changes: duration …….. (weeks)

Type:

□ working to a limited extent

□ going

□ ying

6. Disease and nutrient requirements:

Increase in metabolic requirement resulting from the disease

□ No □ Low □ Medium □ High

II. Physical examination

Severity should be assessed: (0 — no changes, 1 — mild, 2 — moderate, 3 — severe): ……

□ Loss of subcutaneous fat over the triceps muscle and on chest

□ Muscle atrophy (quadriceps, deltoid)

□ Swelling over sacrum

□ Swelling of ankles

□ Ascites

III. Subjective Global Assessment (SGA):

□ Correct nutritional status

□ Suspected or moderate malnutrition

□ Starvation

□ High nutritional risk