

Cancer Nutrition Therapy

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ESPEN expert group recommendations for action against cancer-related Malnutrition-2017
ESPEN guidelines on nutrition in cancer patients-2016
Uptodate
American cancer society



Guidelines recommendations



Introduction

- high risk for malnutrition
- Cause: disease / treatments
- It is estimated that the deaths of 10-20% of patients with cancer can be attributed to malnutrition rather than to the malignancy
- Recent studies in European hospitals found that only 30%-60% of patients with cancer who were at risk of malnutrition actually received nutritional support.



Disease-related malnutrition

- activation of systemic inflammation by an underlying disease such as cancer
- Cause: anorexia and tissue breakdown that can, in turn, result in significant loss of body weight, alterations in body composition, and declining physical function

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Cachexia



- multifactorial wasting syndrome
- characterized by: involuntary weight loss with ongoing loss of skeletal muscle mass with or without loss of fat mass; such wasting cannot be reversed by conventional nutrition care and may lead to functional impairment



pre-cachexia

- In pre-cachexia, early clinical and metabolic signs precede extensive involuntary loss of weight and muscle.
- Risk for cachexia and its worsening depends on factors such as cancer type and stage, extent of systemic inflammation, and degree of response to anticancer therapy

Sarcopenia



- low lean body mass (mostly muscle); fatigue is common, strength may be lessened, and physical function limited
- As functionality is lost, patients with cancer may no longer be able to live independently, and they often report lower quality of life



Sarcopenic obesity

- low lean body mass in obese individuals
- clinicians frequently overlook muscle loss due to the presence of excess fat and extracellular water
- important predictor of adverse outcome, which can be further worsened by surgical interventions

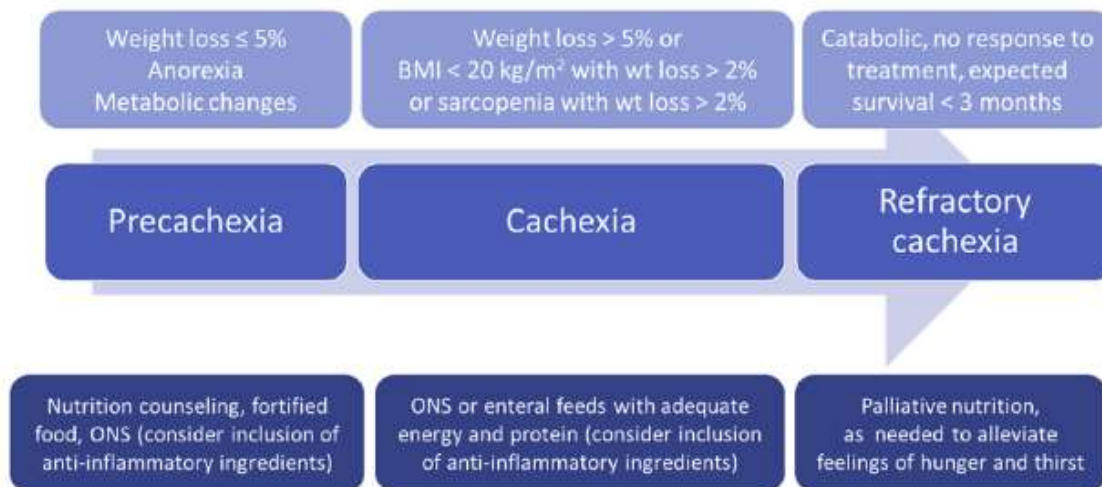


Fig. 4. Medical nutrition care depends on a patient's nutritional and metabolic needs, which are related to cancer stage and nutritional status. Some nutritional strategies can be used across multiple cancer stages. In general, worsening cachexia (with intensifying inflammation) necessitates adjustments in nutritional care. Abbreviations: oral nutritional supplements, ONS; weight, wt.

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The high prevalence of malnutrition in patients with cancer

- 20-70%
- age, cancer type, and cancer stage
- gastrointestinal tract, head and neck, and liver and lung cancers are at high risk for malnutrition

Anorexia and limited food intake

Anorexia is associated with poor food intake by:

- Altered CNS appetite signals with symptoms resulting from cancer or its treatments (nausea, diarrhea, pain)
- Physical limitations to food intake and use (mouth ulcers, GI obstruction)

Precachexia and cachexia

With cachexia, anorexia and weight loss are worsened by:

- Catabolic drivers (inflammatory cytokines) that further reduce nutrient intake and increase metabolic needs

Sarcopenia

Sarcopenia ensues as:

- Body reserves are depleted
- Lean body mass, mostly muscle, is lost

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High health and financial costs of malnutrition in patients with cancer

- loss of weight and muscle
- reduced immune competence and more infections: higher risk of surgical site infections
- psychosocial stress
- lower quality of life: lower scores on QoL scales
- Treatment toxicity
- lower tolerance to chemotherapy
- greater risk of mortality
- longer LOS



Mechanisms underlying cancer-related impairment of nutritional status

- impair food intake
- increase energy and protein needs
- decrease **anabolic stimuli** such as physical activity, and alter metabolism in different organs or tissues.
- Immune response, systemic inflammation, and symptoms: (elevated C-reactive protein, hypoalbuminemia, and their combination as the **Glasgow Prognostic Score**) and changes in **white cell counts** (elevated neutrophil counts, low lymphocyte counts, high neutrophil-to-lymphocyte ratio)

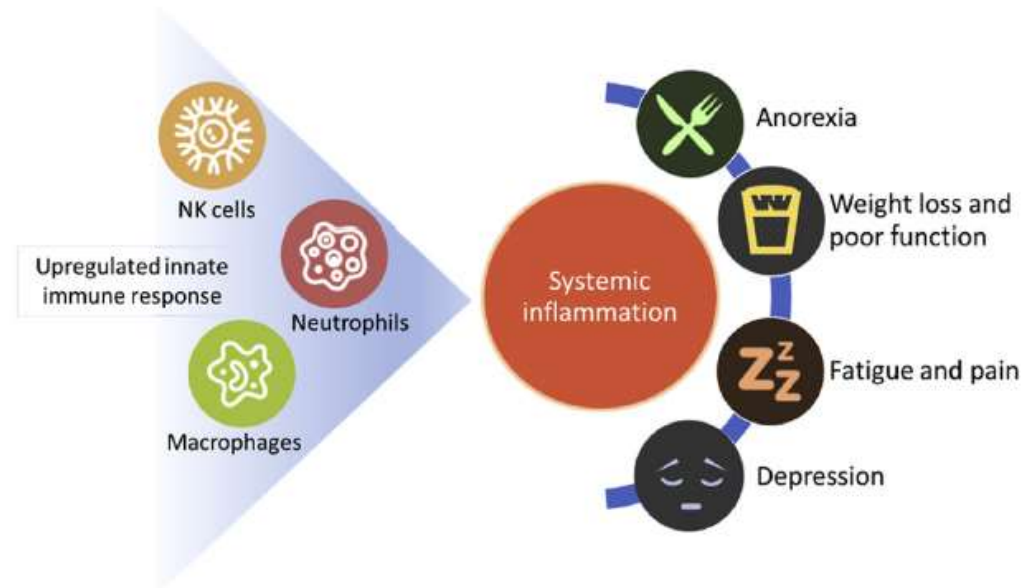


Fig. 2. Association of immunologic, metabolic, and clinical phenomena in cancer. In patients with cancer, systemic inflammation is associated with the host's innate immune response and with clinical symptoms. Abbreviation: natural killer, NK.



cytokines

- Spillover of tumor-derived cytokines worsens systemic inflammation
- proinflammatory cytokines(produced by the tumor) disrupt metabolism of carbohydrates(insulin resistance), fats, and proteins→ IL-1, IL-6, and (TNF-a)
- affect the neuroendocrine control of appetite, leading to anorexia
- cause muscle wasting, resulting in fatigue and impaired physical activity
- Cytokine-regulated loss of adipose tissue, due to increased lipolysis and defective lipogenesis, depletes fat depots that normally serve as energy reserves
- alter production of acute-phase proteins by the liver, which can suppress drug clearance pathways and lead to risk for toxicity of anticancer agents

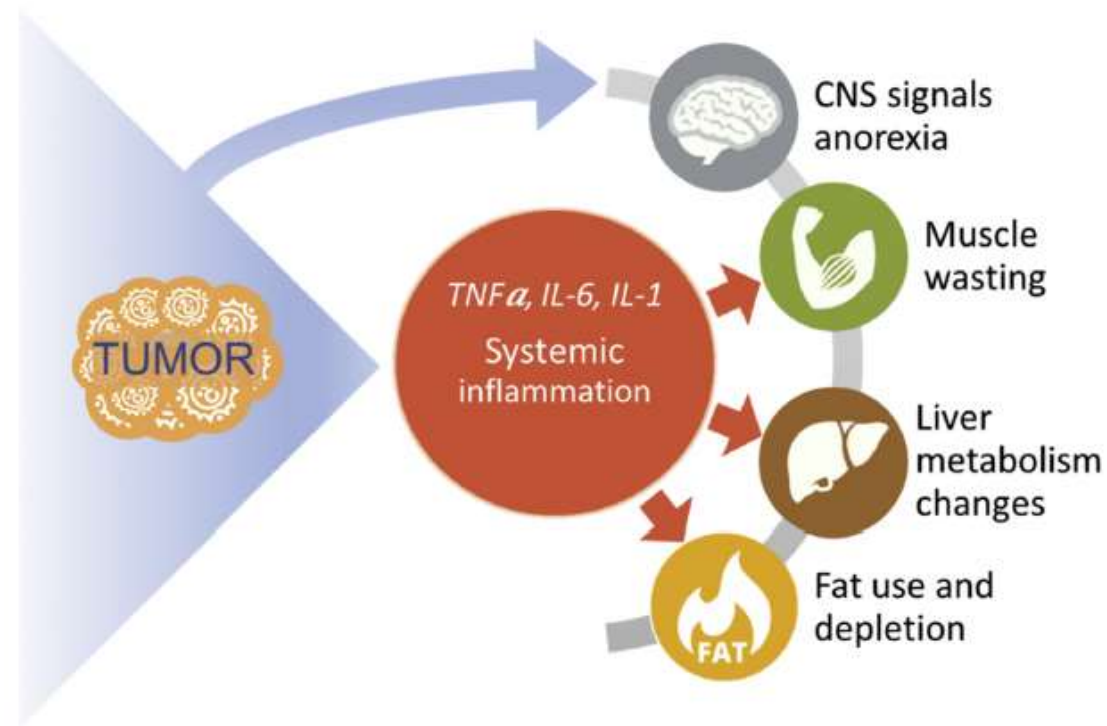



Fig. 3. Pathophysiology and metabolism in the presence of a tumor: the mechanisms. The tumor itself releases inflammatory and other factors that affect the brain, muscle, liver, and fat function. **Brain** – altered appetite signals from the CNS cause anorexia, resulting in reduced caloric intake; **Muscle** – an anabolic/catabolic imbalance leads to muscle wasting, reducing muscle mass and strength, and increasing fatigue; **Liver** – in the liver, acute-phase protein production is stimulated, repressing drug clearance and raising the risk for cancer treatment toxicity; **Fat** – energy stores in fat deposits are depleted as cytokines stimulate increased lipolysis and cause defective lipogenesis, a maladaptive and wasteful response to low food intake. Abbreviations: central nervous system, CNS; IL, interleukin; TNF, tumor necrosis factor.

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Hypoxic stress in the tumor microenvironment

- Tumor hypoxia occurs when tumor cells have been deprived of oxygen(growing rapidly)
- tumor metabolism is altered to rely more on glycolysis and less on oxidative phosphorylation, and protection against harmful reactive oxygen species is reduced
- So→enhanced tumor growth, malignant progression, and even resistance to anticancer therapy
- Nutritional interventions, by modulating the local generation of reactive oxygen species might potentially interfere with these processes.



Indirect effects of cancer or its treatments

- side effects of cancer treatments (drug- or radiation-therapy, surgery) or tumor-related local effects like tissue infiltration or physical obstruction
- Such conditions include pain, fatigue, dry mouth or mouth ulcers, difficulty chewing, thick saliva, dysphagia, abdominal pain, nausea, intractable vomiting due to intestinal blockage, constipation, and diarrhea due to infections or malabsorption

Addressing malnutrition: diagnosis and treatment

- Secondary cause of reduced intake: oral ulceration, xerostomia, poor dentition, intestinal obstruction, malabsorption, constipation, diarrhea, nausea, vomiting, reduced intestinal motility, chemosensory alteration, uncontrolled pain, and side effects of drugs

		BMI (kg/m ²)				
		28	25	22	20	
Weight loss (%)	2.5	0	0	1	1	3
	6	1	2	2	2	3
	11	2	3	3	3	4
	15	3	3	3	4	4
	15	3	4	4	4	4

Fig. 2. Grading scheme (grades 0–4) to predict overall survival in patients with advanced cancer. The grading scheme is based on groupings of BMI and weight loss showing distinct median survival (0: best, 4: worst prognosis). ($p < 0.001$; adjusted for age, sex, disease site, stage and performance status). (Adapted from 25).

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Despite numerous advances in treatments and care for people with cancer, malnutrition remains an unresolved issue.

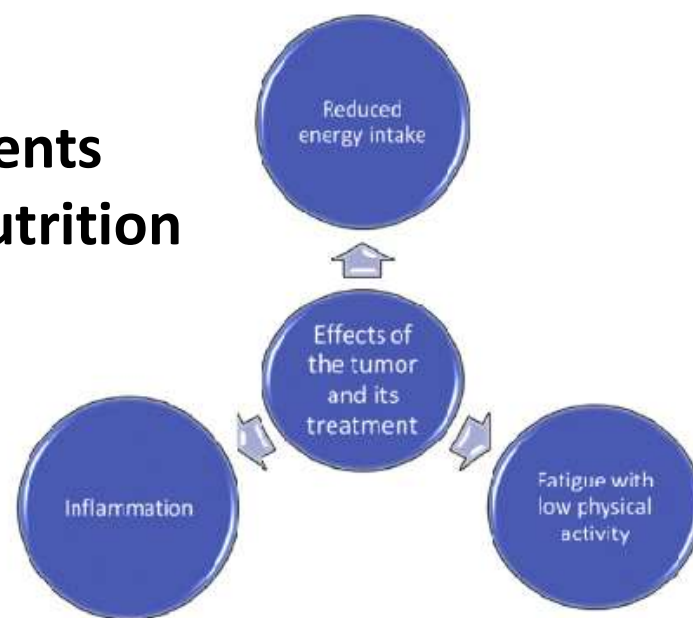
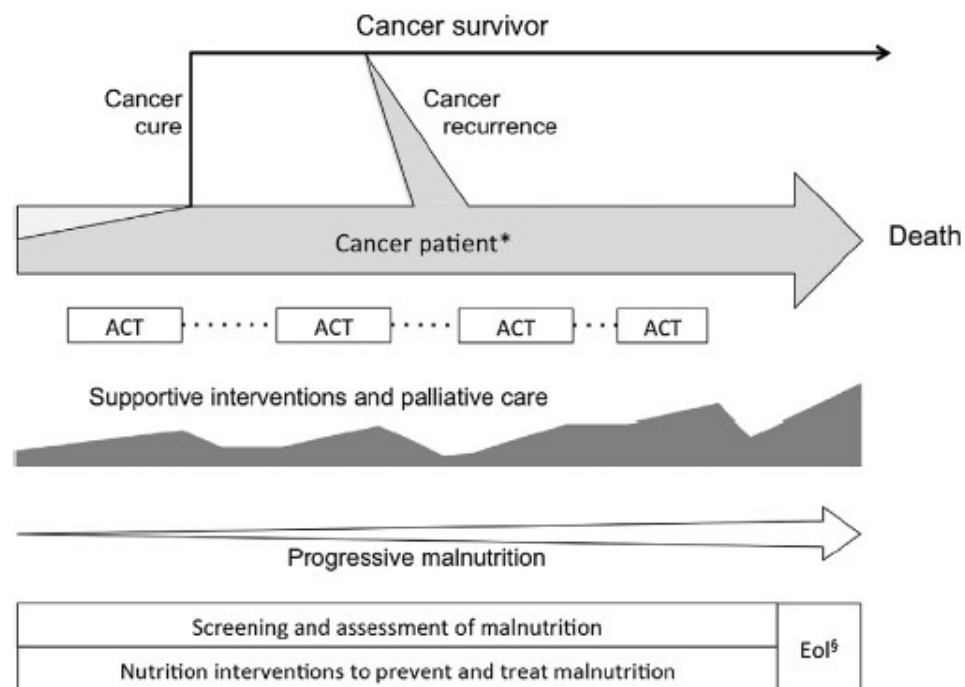


Fig. 5. Three major negative effects of tumors and their treatment. The 3 principal adverse effects represent 3 potential targets for interventions by (1) nutritional support, (2) physical rehabilitation, and (3) anti-inflammatory nutrients or medications.



ACT, anti-cancer treatments

*curative setting: ☐ palliative setting: ☐

§ End of life, imminent death: symptomatic treatment only



Muscle protein depletion is a hallmark of cancer cachexia, severely impinging quality of life and negatively impacting physical function and treatment tolerance.

This can be assessed as follows:

- mid upper-arm muscle area by anthropometry (men <32 cm², women <18 cm²)
- appendicular skeletal muscle index determined by dual energy x-ray absorptiometry (men <7.26 kg/m²; women <5.45 kg/m²)
- lumbar skeletal muscle index determined from oncological CT imaging (men <55 cm²/m²; women <39 cm²/m²)
- whole body fat-free mass index without bone determined by bioelectrical impedance (men <14.6 kg/m²; women <11.4 kg/m²)



To detect nutritional disturbances at an early stage, we recommend to **regularly evaluate** nutritional intake, weight change and BMI, beginning with cancer diagnosis and repeated depending on the stability of the clinical situation

- NRS-2002
- MUST
- MST
- MNA

NUTRIC Score¹

The NUTRIC Score is designed to quantify the risk of critically ill patients developing adverse events that may be modified by aggressive nutrition therapy. The score, of 1-10, is based on 6 variables that are explained below. The scoring system is shown in Tables 1 and 2.

Table 1: NUTRIC Score variables

Variable	Range	Points
Age	<50	0
	50 - <75	1
	≥75	2
APACHE II	<15	0
	15 - <20	1
	20-28	2
	≥28	3
SOFA	<6	0
	6 - <10	1
	≥10	2
Number of Co-morbidities	0-1	0
	≥2	1
Days from hospital to ICU admission	0 - <1	0
	≥1	1
IL-6	0 - <400	0
	≥ 400	1

Table 2: NUTRIC Score scoring system: if IL-6 available

Sum of points	Category	Explanation
6-10	High Score	<ul style="list-style-type: none"> ➤ Associated with worse clinical outcomes (mortality, ventilation). ➤ These patients are the most likely to benefit from aggressive nutrition therapy.
0-5	Low Score	<ul style="list-style-type: none"> ➤ These patients have a low malnutrition risk.

Table 3. NUTRIC Score scoring system: If no IL-6 available*

Sum of points	Category	Explanation
5-9	High Score	<ul style="list-style-type: none"> ➤ Associated with worse clinical outcomes (mortality, ventilation). ➤ These patients are the most likely to benefit from aggressive nutrition therapy.
0-4	Low Score	<ul style="list-style-type: none"> ➤ These patients have a low malnutrition risk.

*It is acceptable to not include IL-6 data when it is not routinely available; it was shown to contribute very little to the overall prediction of the NUTRIC score.

¹ Heyland DK, Dhaliwal R, Jiang X, Day AG. Identifying critically ill patients who benefit the most from nutrition therapy: the development and initial validation of a novel risk assessment tool. *Critical Care*. 2011;15(6):R268.

Nutritional Risk Screening (NRS 2002)

Table 1 Initial screening

		Yes	No
1	Is BMI <20.5?		
2	Has the patient lost weight within the last 3 months?		
3	Has the patient had a reduced dietary intake in the last week?		
4	Is the patient severely ill? (e.g. in intensive therapy)		

Yes: If the answer is 'Yes' to any question, the screening in Table 2 is performed.
No: If the answer is 'No' to all questions, the patient is re-screened at weekly intervals. If the patient e.g. is scheduled for a major operation, a preventive nutritional care plan is considered to avoid the associated risk status.

Table 2 Final screening

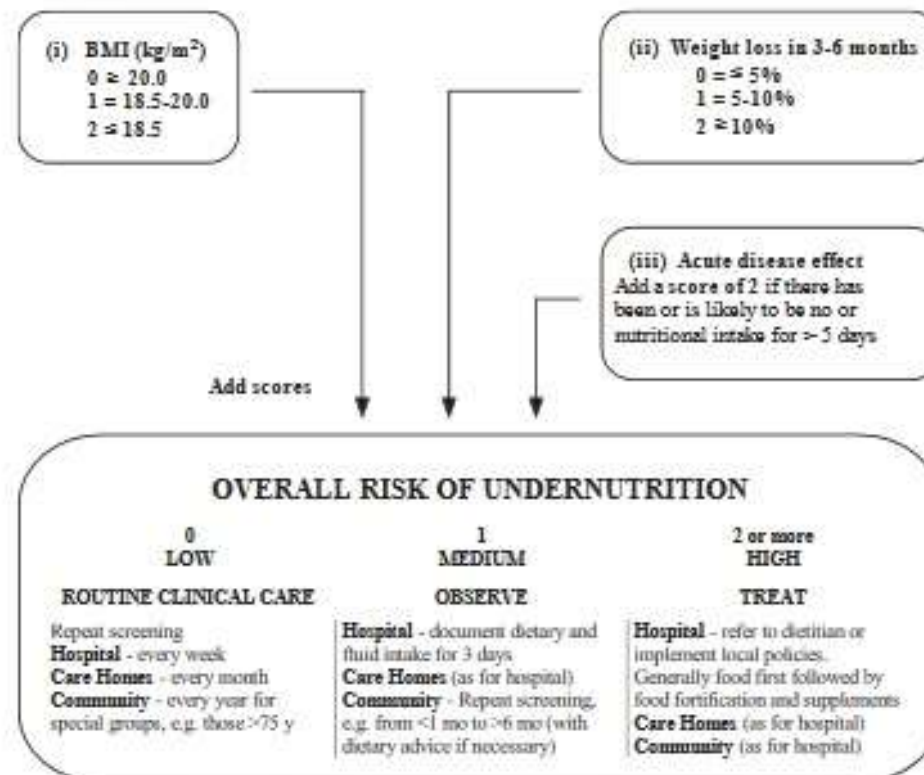
Impaired nutritional status		Severity of disease (≈ increase in requirements)	
Absent Score 0	Normal nutritional status	Absent Score 0	Normal nutritional requirements
Mild Score 1	Wt loss > 5% in 3 mths or Food intake below 50-75% of normal requirement in preceding week	Mild Score 1	Hip fracture* Chronic patients, in particular with acute complications: cirrhosis*, COPD*. Chronic hemodialysis, diabetes, oncology
Moderate Score 2	Wt loss > 5% in 2 mths or BMI 18.5 - 20.5 + impaired general condition or Food intake 25-60% of normal requirement in preceding week	Moderate Score 2	Major abdominal surgery* Stroke* Severe pneumonia, hematologic malignancy
Severe Score 3	Wt loss > 5% in 1 mth (> 15% in 3 mths) or BMI < 18.5 + impaired general condition or Food intake 0-25% of normal requirement in preceding week in preceding week	Severe Score 3	Head injury* Bone marrow transplantation* Intensive care patients (APACHE > 10).
Score:	+	Score:	- Total score
Age	if ≥ 70 years: add 1 to total score above	- age-adjusted total score	
Score < 3: weekly re-screening of the patient. If the patient e.g. is scheduled for a major operation, a preventive nutritional care plan is considered to avoid the associated risk status.		Score ≥ 3: the patient is nutritionally at-risk and a nutritional care plan is initiated	

NRS-2002 is based on an interpretation of available randomized clinical trials.
*Indicates that a trial directly supports the categorization of patients with that diagnosis. Diagnoses shown in *italics* are based on the prototypes given below.
Nutritional risk is defined by the present nutritional status and risk

A nutritional care plan is indicated in all patients who are
(1) severely undernourished (score = 3), or (2) severely ill (score = 3), or (3) moderately undernourished + mildly ill (score 2 + 1), or (4) mildly undernourished + moderately ill (score 1 + 2).
Prototypes for severity of disease
Score = 1: a patient with chronic disease

quirement is increased, but can be covered by oral diet or supplements in most cases.
Score = 2: a patient confined to bed due to illness, e.g. following major abdominal surgery. Protein requirement is substantially increased, but can be covered, although artificial feeding is required in many cases.
Score = 3: a patient in intensive care with assisted ventilation etc. Protein requirement is increased and cannot be covered even by artificial feeding. Protein breakdown and nitrogen loss can be significantly attenuated.

Malnutrition Universal Screening Tool (MUST) for adults



Can be adapted for special circumstances (e.g. when weight and height cannot be measured or when there are fluid disturbances) using specified alternative measurements including subjective criteria. It also identifies obesity ($\text{BMI} > 30 \text{ kg}/\text{m}^2$).

Initial Screening in Mini Nutritional Assessment (MNA[®]) for the elderly

A	Has food intake declined over the past 3 months due to loss of appetite, digestive problems, chewing or swallowing difficulties? 0 = severe loss of appetite 1 = moderate loss of appetite 2 = no loss of appetite
B	Weight loss during last months? 0 = weight loss greater than 3 kg 1 = does not know 2 = weight loss between 1 and 3 kg 3 = no weight loss
C	Mobility? 0 = bed or chair bound 1 = able to get out of bed/chair but does not go out 2 = goes out
D	Has suffered physical stress or acute disease in the past 3 months? 0 = yes 2 = no
E	Neuropsychological problems? 0 = severe dementia or depression 1 = mild dementia 2 = no psychological problems
F	Body Mass Index (BMI) [weight in kg]/[height in m]² 0 = BMI less than 19 1 = BMI 19 to less than 21 2 = BMI 21 to less than 23 3 = BMI 23 or greater
Screening score (total max. 14 points)	
12	points or greater
11	points or below
Normal—not at risk → no need to complement assessment	
Possible malnutrition → continue assessment	



Addressing malnutrition: diagnosis and treatment

- Importance of early nutrition screening
- traditionally on low body weight (or BMI) (ineffective/why?)
- Anorexia → early risk indicator
- weight loss
- Inadequate nutritional intake is confirmed if patients cannot eat for a week or if their energy intake is less than 60% of estimated requirements for 1-2 weeks
- Glasgow Prognostic Score (GPS)
- imaging techniques



In patients with abnormal screening, we recommend objective and quantitative assessment of nutritional intake, nutrition impact symptoms, muscle mass, physical performance and the degree of systemic inflammation.

Physical performance may be graded using :

- WHO/ECOG scale (0 = normal performance, 4 = bed-bound)



We recommend, that total energy expenditure of cancer patients, if not measured individually, be assumed to be similar to healthy subjects and generally ranging between 25 and 30 kcal/kg/day.

Problem?



- We recommend that protein intake should be above 1 g/kg/day and, if possible up to 1.5 g/kg/day
- minimum protein supply of 1 g/kg/day and a target supply of 1.2-2 g/kg/day
- chronically ill older subjects call for a protein supply of 1.2-1.5 g/kg/d
- in patients with acute or chronic renal failure protein supply should not exceed 1.0 or 1.2 g/kg/d, respectively
- Composition of amino acid mixtures: do not need any specifically formulated amino acid mixture

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ESPEN guidelines on nutrition in cancer patients-2016



In weight-losing **cancer** patients with **insulin resistance** we recommend to **increase the ratio of energy from fat** to energy from carbohydrates. This is intended to increase the energy density of the diet and to reduce the glycemic load.

-problem?



We recommend that **vitamins and minerals** be supplied in amounts approximately **equal to the RDA** and discourage the use of high-dose micronutrients in the absence of specific deficiencies

We recommend nutritional intervention to **increase oral intake** in cancer patients who are able to eat but are malnourished or at risk of malnutrition. This includes dietary advice, the treatment of symptoms and derangements impairing food intake (nutrition impact symptoms), and offering **oral nutritional supplements**.




We recommend to not use dietary provisions that **restrict energy intake** in patients with or at risk of malnutrition

We **recommend against all forms of diets** that are not based on clinical evidence, have no proven efficacy, and that potentially could be harmful



If a decision has been made to feed a patient, we recommend enteral nutrition if **oral** nutrition remains inadequate despite nutritional interventions (counselling, **ONS**), and **parenteral** nutrition if **enteral** nutrition is not sufficient or feasible.

In patients with chronic insufficient dietary intake and/or uncontrollable malabsorption, we recommend home artificial nutrition (either enteral or parenteral) in suitable patients



refeeding syndrome

If oral food intake has been decreased severely for a prolonged period of time, we recommend to increase (oral, enteral or parenteral) nutrition only slowly over several days and to take additional precautions to prevent a refeeding syndrome

- Hypophosphataemia
- Hypokalaemia
- hypomagnesaemia



refeeding syndrome

- minimal food intake for at least 5 days:
- it has been recommended that **no more than half** of the calculated energy requirements be supplied **during the first 2 days** of feeding.
- If depletion is severe, initial energy supply should **not exceed 5-10 kcal/kg/day** and then a slow increase of energy intake over **4-7 days**
- **vitamin B1** in daily doses of **200-300 mg**
- The following electrolytes should be monitored and substituted, if necessary, by the oral, enteral, or parenteral route



We recommend maintenance or an increased level of physical activity in cancer patients to support muscle mass, physical function and metabolic pattern

We suggest individualized **resistance exercise** in addition to **aerobic exercise** to maintain muscle strength and muscle mass



We suggest considering **corticosteroids** to increase the appetite of anorectic cancer patients with advanced disease for a restricted period of time (1-3 weeks) but to be aware of side effects (e.g. muscle wasting, insulin resistance, infections).

We suggest considering **progestins** to increase the appetite of anorectic cancer patients with advanced disease but to be aware of potential serious side effects (e.g. thromboembolism).



There are insufficient consistent clinical data to recommend cannabinoids to improve taste disorders or anorexia in cancer patients



There are insufficient consistent clinical data to recommend currently approved **androgenic steroids** to increase muscle mass

There are insufficient consistent clinical data to recommend the supplementation with **branched-chain or other amino acids** or metabolites to improve fat free mass.



There are insufficient consistent clinical data to recommend **non-steroidal antiinflammatory drugs** to improve body weight in weight losing cancer patients.



In patients with advanced cancer undergoing chemotherapy and at risk of weight loss or malnourished, we suggest to use supplementation with **long-chain N-3 fatty acids or fish oil** to stabilize or improve appetite, food intake, lean body mass and body weight



In patients complaining about **early satiety**, after diagnosing and treating constipation, we suggest to consider **prokinetic** agents, but to be aware of potential adverse effects of **metoclopramide** on the central nervous system and of **domperidone** on cardiac rhythm



For all cancer patients undergoing either curative or palliative **surgery** we recommend management within an **enhanced recovery after surgery (ERAS) program**; within this program every patient should be screened for malnutrition and if deemed at risk, given additional nutritional support.

For a patient undergoing **repeated surgery** as part of a multimodal oncological pathway, we recommend management of each surgical episode within an **ERAS** program.



In upper GI cancer patients undergoing surgical resection in the context of traditional perioperative care we recommend oral/enteral immunonutrition.

In surgical cancer patients at risk of malnutrition or who are already malnourished we recommend appropriate nutritional support both during hospital care and following discharge from hospital

- **Arginine** and **nucleotides** (immunesupporting ingredients in enteral feeding formulas in surgical and radiation patients)



We recommend that during radiotherapy (RT) e with special attention to RT of the head and neck, thorax and gastrointestinal tract e an adequate nutritional intake should be ensured primarily by individualized nutritional counseling and/or with use of oral nutritional supplements (ONS), in order to avoid nutritional deterioration, maintain intake and avoid RT interruptions



We recommend enteral feeding using **naso-gastric** or percutaneous tubes (e.g. **PEG**) in radiation-induced **severe mucositis** or in **obstructive tumors** of the head-neck or thorax.

We recommend to screen for and manage **dysphagia** and to encourage and educate patients on **how to maintain their swallowing function** during enteral nutrition.



There are insufficient consistent clinical data to recommend **glutamine** to prevent radiation-induced enteritis/diarrhea, stomatitis, esophagitis or skin toxicity

There are insufficient consistent clinical data to recommend **probiotics** to reduce radiation-induced diarrhea

We do not recommend parenteral nutrition (PN) as a general treatment in radiotherapy but only if adequate oral/enteral nutrition is not possible, e.g. in severe radiation enteritis or severe malabsorption



During anticancer drug treatment we recommend to ensure an **adequate nutritional intake** and to **maintain physical activity**.

In a patient undergoing curative anticancer drug treatment, if oral food intake is inadequate despite counselling and oral nutritional supplements (**ONS**), we recommend supplemental **enteral** or, if this is not sufficient or possible, **parenteral** nutrition



There are insufficient consistent clinical data to recommend **glutamine** supplementation during conventional cytotoxic or targeted therapy.

During intensive chemotherapy and after stem cell transplantation we recommend to maintain **physical activity** and to ensure an **adequate nutritional intake**. This may require enteral and/or parenteral nutrition.

There are insufficient consistent clinical data to recommend **glutamine** to improve clinical outcome in patients undergoing high-dose chemotherapy and hematopoietic stem cell transplantation.



If oral nutrition is inadequate we suggest preferring enteral tube feeding to parenteral nutrition, unless there is **severe mucositis, intractable vomiting, ileus, severe malabsorption, protracted diarrhea** or **symptomatic gastrointestinal graft versus host disease (GvHD)**.

There are insufficient consistent clinical data to recommend a **low bacterial diet** for patients more than 30 days after allogeneic transplantation



We recommend that **cancer survivors** engage in **regular physical activity**

In **cancer survivors** we recommend to maintain a healthy weight (BMI 18.5-25 kg/m²) and to maintain a healthy lifestyle, which includes being physically active and a diet based on vegetables, fruits and whole grains and low in saturated fat, red meat and alcohol



We recommend to **routinely screen** all patients with **advanced cancer** for inadequate nutritional intake, weight loss and low body mass index, and if found at risk, to assess these patients further for both treatable nutrition impact symptoms and metabolic derangements

We recommend offering and implementing nutritional interventions in patients with **advanced cancer only after considering** together with the patient the prognosis of the malignant disease and both the expected benefit on quality of life and potentially survival as well as the burden associated with nutritional care.



In [dying patients](#), we recommend that treatment be **based on comfort**. Artificial hydration and nutrition are unlikely to provide any benefit for most patients. However, in acute confusional states, we suggest to use a [short and limited hydration](#) to rule out dehydration as precipitating cause



Products in the market





Pure Protein®

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Nutrition Facts

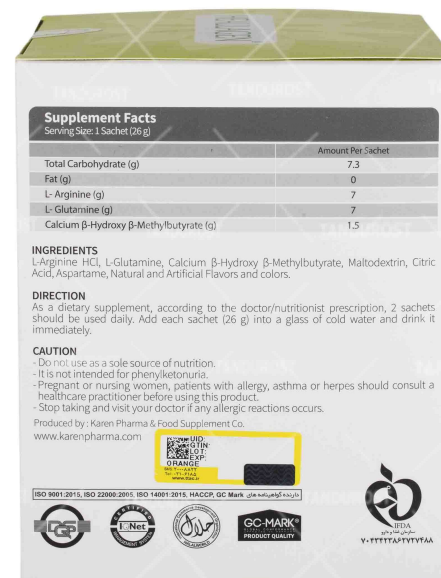
Serving size: 1 sachet (15 g)

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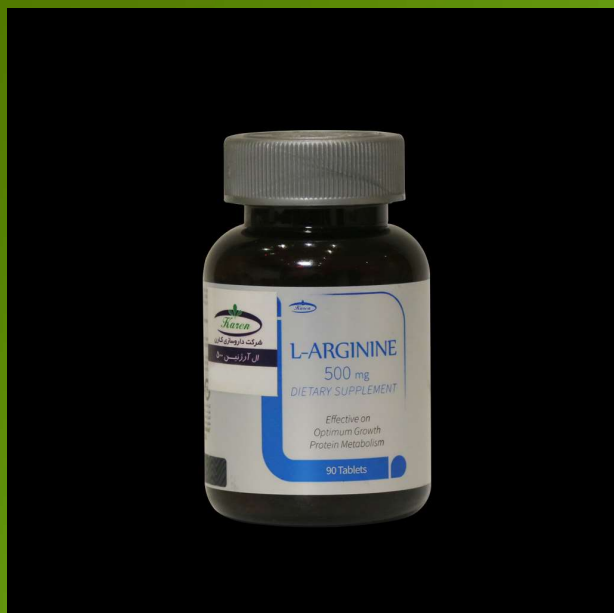
	Amount Per Serving	% Daily Value*
Calories	58	
Total Carbohydrate (g)	1	0.3
Total Fat (g)	0.4	0.6
Protein (g)	12.6	25
Glutamine (g)	3.8	†
Calcium (mg)	48	4.8
Phosphorus (mg)	60	6
Sodium (mg)	21	0.9
Potassium (mg)	60	1.7

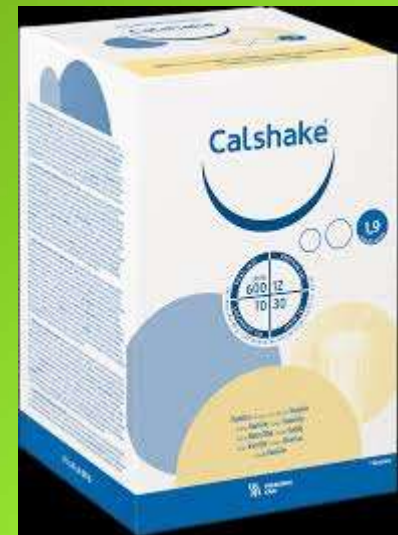
*Percent daily values are based on a 2000 calorie diet.

†Daily value not established.

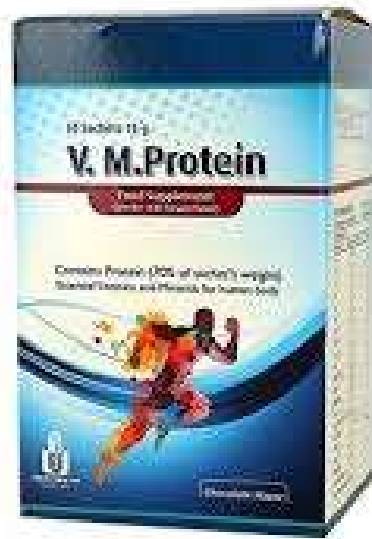





















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Products and Nutritional Information Per Serving

Product	Flavors	Calories	Protein (g)	Carbohydrate (g)	Total Sugars (g)	Fat (g)	Fiber (g)	Gluten-free	Suitable for Lactose Intolerance
 OPTIFAST 800® Ready-to-Drink Shake	<ul style="list-style-type: none"> • Vanilla • Chocolate • Strawberry 	160	16	18	4	3.5	3	Yes	Yes
 OPTIFAST 800® Shake Mix	<ul style="list-style-type: none"> • Vanilla • Chocolate • Strawberry 	160	16	18	4	3.5	3	Yes	Yes
 OPTIFAST 800® Soup Mix	<ul style="list-style-type: none"> • Tomato • Chicken • NEW Vegetable 	160	16	18	5-7	3.5	3	Yes	Yes
 OPTIFAST 800® Bar	<ul style="list-style-type: none"> • Chocolate • Peanut Butter • Chocolate • Apple Cinnamon (mid-2017) 	160	16	18	1-2	4.5-5	3	No	Yes
 OPTIFAST HP® Shake Mix	<ul style="list-style-type: none"> • Vanilla • Chocolate 	200	26	10	9	6	0	Yes	No





Treatment and usual side effects

American cancer society



constipation

What the patient can do

- **stool softeners or fiber** supplements
- Try to eat at the **same times** each day. If possible, try to move your bowels at the same time every day.
- **Keep track** of bowel movements so that problems can be noticed quickly.
- If it's ok with your cancer care team, eat **more high-fiber foods** every day, such as whole-grain breads and cereals; fresh raw fruits with skins and seeds; fresh raw vegetables; fruit juices; and dates, apricots, raisins, prunes, prune juice, and nuts.
- Drink **more fluids**. **Pasteurized fruit juices** and warm or hot fluids in the morning are often helpful.
- Get as much light **exercise** as possible.
- Go to the **bathroom as soon** there is an urge.
- Avoid foods and drinks that cause **gas**, such as **apples, avocados, beans and peas, cabbage, broccoli, milk, and fizzy drinks**, until the constipation is gone.
- Avoid **chewing gum** and using **straws** to drink. Using them can also cause gas.
- Avoid or cut back on any foods that may cause constipation, such as **cheese or eggs**..
- Do not use **enemas or suppositories**. Always **ask** your cancer team before using stool softeners or laxatives.



constipation

What caregivers can do

- Encourage **extra fluids**: offer **prune juice**, hot water with lemon, coffee, or tea to help make bowels move.
- Help keep a **record** of bowel movements.

Call the cancer care team if the patient

Has not had a bowel movement in **3 days** (or a certain period of time your cancer care team might talk about before treatment starts).

Has **blood** in or around the anal area or blood in the stool.

Hasn't moved bowels in **1 or 2 days** after taking a softener or laxative.

Has **belly cramps** or **vomiting** that doesn't stop.



Dehydration and Lack of Fluids

What to look for

- Dry mouth and lips
- Thirst
- Dizziness or weakness
- Trouble swallowing dry food
- Dry, sticky mouth that makes it hard to talk
- Dry skin, skin that “tents” (stays up) when lightly pinched
- A swollen, cracked, or dry tongue
- Higher than normal body temperature with or without chills
- Rapid weight loss
- Little or no urine
- [Constipation](#)
- [Fatigue](#)
- Sunken eyeballs
- Poor appetite and no thirst (Dehydrated people often feel less hungry and thirsty.)



Dehydration and Lack of Fluids

What the patient can do

- **Keep** a food and fluid **diary**.
- Drink fluids. Sometimes **iced fluids** are easier.
- Remember that food contains fluid. Try to eat **fruits, vegetables, soups, gelatins, Popsicles, and other - moist foods**.
- Try to get rid of the cause of dehydration, such as **vomiting, diarrhea, or fever**.
- Apply **lubricant** to lips to avoid painful cracking.
- Fill a **small cooler with juice boxes, bottled water, or other drinks** and keep it **next to you**, if it's tiring to get up.
- Suck **ice chips** to relieve dry mouth if you can't drink enough liquid.



Dehydration and Lack of Fluids

What caregivers can do

- Offer **cold or cool liquids** every hour or so. If the patient is very weak, try giving liquids with a small medication **syringe** that you can get at a pharmacy.
- Encourage the patient to **eat small meals several times** a day if they can.
- Include **moist foods, soups, and fruit smoothies** (made with ice in a blender) as snacks.
- Keep an intake and output diary by tracking food and fluid intake and by watching the urine output.
- Check the patient often to be sure they haven't become confused.
- When the patient stands up after sitting or when getting up from bed, encourage them to do it slowly. -
- Stand nearby, in case they get dizzy or feel faint.
- If the patient gets dizzy or feels faint, offer fluids and have them sit or lie down.



Diarrhea

What the patient can do

- Ask the cancer care team if diarrhea can be expected ...
- Try a **clear liquid diet** (one that includes water, weak tea, apple juice, peach or apricot nectar, clear broth, popsicles, and gelatin with no solids added) when diarrhea starts or when you feel that it's going to start. **Avoid acidic drinks**, such as tomato juice, citrus juices, and fizzy soft drinks.
- Take medicine for diarrhea only if and as prescribed.
- Track the amount and frequency of bowel movements.
- Include foods that are **high in potassium** (such as bananas, potatoes, apricots, and sports drinks).
- Drink and eat **high-sodium** (salt) foods like broths, soups, sports drinks, crackers, and pretzels.
- Drink at least 1 cup of liquid after each loose bowel movement. Keep liquids caffeine-free. Try water, sports drinks, or bouillon.
- As diarrhea improves, try eating small amounts of foods that are **easy to digest** such as **rice, bananas, applesauce, yogurt, mashed potatoes, low-fat cottage cheese, and dry toast**.
- If diarrhea keeps getting better after a day or 2, start small regular meals.



Diarrhea

What the patient can do


- Avoid milk or milk products if they seem to make diarrhea worse. Yogurt and buttermilk are usually OK.
- Avoid pastries, candies, rich desserts, jellies, and preserves.
- Avoid high-fat foods, like fried and greasy foods because they also can make diarrhea worse.
- Don't drink alcohol or use tobacco.
- Avoid high-fiber foods, which might make diarrhea worse. These include nuts, seeds, whole grains, legumes (beans and peas), dried fruits, and raw fruits and vegetables.
- Do not chew sugar-free gum or eat candies and desserts made with sugar alcohol (i.e., sorbitol, mannitol, or xylitol).



Loss of Appetite

What the patient can do

- Eat **several small** meals or snacks throughout the day, rather than 3 large meals.
- Avoid drinking liquids with meals, or take only small sips of liquids while eating to keep from feeling full early (unless you need liquids to help swallow or for dry mouth). But remember it's important to stay hydrated, so it might be best to drink most of your liquids between meals.
- Make **eating more enjoyable** by setting the table with **pretty dishes**, playing your **favorite music**, **watching TV**, or **eating with someone**.
- Be as **physically active** as you can. Start off slowly, and increase your activity over time as you feel stronger. Sometimes a short walk an hour or so **before meals** can help you feel hungry.
- Keep **high-calorie, high-protein snacks on hand**. Try hard-cooked eggs, peanut butter, cheese, ice cream, granola bars, liquid nutritional supplements, puddings, nuts, canned tuna or chicken, or trail mix.
- Review the tips on adding calories and protein to foods and include these in meals and snacks throughout the day.
- **Eat your favorite foods any time of the day**; for instance, if you like breakfast foods, you can eat them for dinner.



Loss of Appetite

What caregivers can do

- Try giving the patient 6 to 8 small meals and snacks each day.
- Offer **starchy foods**, such as bread, pasta, or potatoes, with high-protein foods, such as fish, chicken, meats, turkey, eggs, cheeses, milk, tofu, nuts, peanut butter, yogurt, peas, and beans.
- Keep **cool drinks and juices** within the patient's reach.
- If the **smell** of food bothers the patient, **serve bland foods cold or at room temperature**.
- Create pleasant settings for meals, and eat with the patient.
- Offer **fruit smoothies, milkshakes, or liquid meals** when the patient doesn't want to eat.
- Try plastic forks and knives instead of metal if the patient is bothered by bitter or metallic tastes.
- Don't blame yourself if the patient refuses food or can't eat.
- **Be encouraging, but try not to nag or fight about eating.**
- If the patient can't eat, you might want to offer just your company. Or offer to read to them or give them a massage.




Mouth Dryness or Thick Saliva

Treatment for dry mouth or thick saliva

Treatment for dry mouth and thick saliva includes increasing comfort and preventing infection or complications. Good mouth care and frequent [sips of water](#) are helpful ways to manage problems with dry mouth or thick saliva. [Avoiding alcohol intake and tobacco](#), avoiding certain foods, and keeping [caffeine and sugar](#) (in candy, gum, or soft drinks) to a minimum can help keep a dry mouth and thick saliva from getting worse. If you are having trouble eating or are eating less, talk to your cancer care team about whether nutritional supplements may be helpful.

What the patient can do

- Rinse your mouth every 2 hours with a solution recommended by your cancer care team.
- Take [small bites](#), and [chew your food well](#).
- [Sip liquids](#) with meals to [moisten foods](#) and help with [swallowing](#).
- Add [liquids](#) (such as [gravy](#), [sauce](#), [milk](#), and [yogurt](#)) to solid foods.
- Try [ice chips](#), sugarless hard candies, and sugarless chewing gum.
- Keep cold water nearby for frequent sips between meals and mouth rinses.
- Rinse or spray mouth often using [artificial saliva](#), which is sold in drugstores.




Mouth Dryness or Thick Saliva

- Use petroleum jelly, cocoa butter, or a mild lip balm to keep lips moist.
- Suck on sugarless candy or chew sugarless gum to stimulate saliva. Citrus, cinnamon, and mint flavors often work well.
- Use a cool mist humidifier to moisten room air, especially at night. (Be sure to keep the humidifier clean to avoid spreading bacteria or mold in the air.)
- Avoid drinking alcohol.
- Avoid tobacco.
- Avoid hot, spicy, or acidic foods.
- Avoid chewy candies, tough meats, pretzels and chips, and hard raw fruits or vegetables.
- Avoid store-bought mouthwashes containing alcohol.

What caregivers can do

- Offer small, soft meals with extra sauce or dressings for dipping.
- Offer ice cream, gelatin desserts, ice chips, and frozen drinks.
- Keep liquids nearby for frequent sipping.
- Help the patient track their fluid intake, and encourage them to take in 2 to 3 quarts of liquid each day, if the care team approves. Ice, ice cream, sherbet, popsicles, and gelatin count as liquids.



Mouth Sores and Pain

- Asking about medicine that can be swished **15 to 20 minutes before meals** or painted on a painful sore with a cotton swab before meals.
- Asking about other medicines to relieve pain.
- Eating **chilled foods** and fluids (such as Popsicles, ice chips, frozen yogurt, sherbet, or ice cream).
- Eating soft, moist foods that are easy to swallow.
- Using a **straw**.
- Not eating **very salty, spicy, or sugary foods**.
- Avoiding **acidic fruits** and juices, such as tomato, orange, grapefruit, lime, or lemon.
- Offer pain medicines 30 minutes before mealtime



Nausea

- Eat the foods you like and those that **sound good** to you. For example, some people develop a dislike for red meat and meat broths during treatment. In that case, try other protein sources, such as fish, chicken, beans, and nuts.
- If the nausea only happens between meals, keep something in your stomach. Eat frequent, small snacks throughout the day. Snack ideas include smoothies, trail mix, and fruit.
- **Do not skip meals or** snacks. If your stomach is empty, your nausea might be worse.
- On chemotherapy treatment days, **eat a small meal or snack before treatment.**
- **Try to avoid eating your favorite foods when you have nausea.** If you eat foods you like when you are nauseated, you could find them unappealing when treatment is over because you associated them with feeling sick.
- Sip **liquids slowly** throughout the day. You may find it easier to tolerate **cold and clear liquids** (Clear liquids are those you can see through, such as **ginger ale, apple juice, broth, tea, etc.**)
- Also try **popsicles or gelatin.** Suck on hard candy with pleasant smells, such as **lemon drops or mints,** to help get rid of bad tastes. (Don't eat tart candies if you have mouth sores.)



Nausea

- Eat bland foods, such as **dry toast and crackers**.
- Eat food **cold** or at room temperature to decrease its smell and taste.
- Avoid fatty, fried, spicy, or very sweet foods.
- Try small amounts of foods **high in calories** that are easy to eat (such as pudding, ice cream, sherbets, yogurt, and milkshakes) several times a day.
- Use butter, oils, syrups, sauces, and milk in foods to raise calories.
- **Avoid low-fat foods unless** fats upset your stomach or cause other problems.
- Tart or sour foods may be easier to keep down (unless you have mouth sores).
- Try to rest quietly while sitting upright for at least an hour after each meal.
- Distract yourself with soft music, a favorite TV program, or the company of others.



Swallowing Problems

What the patient can do

- Eat bland foods that are soft and smooth but high in calories and protein (such as cream-based soups, pudding, ice cream, yogurt, and milkshakes).
- Take small bites, and swallow each bite completely before taking another.
- Use a straw for liquids and soft foods.
- Try thicker liquids (such as fruit that has been pureed in the blender or liquids with added thickeners), because they're easier to swallow than thin liquids.
- Mash or puree foods (such as meats, cereals, and fresh fruits) so that they're as soft as baby food. You might need to add liquids to dry foods before blending.
- Dunk breads in milk to soften.
- Refrigerate food (the cold helps numb pain) or serve cool or lukewarm. If pain gets worse with cold foods, try them at room temperature.
- Try crushed ice and liquids at meals.
- Frequent small meals and snacks may be easier to manage.
- Crush pills or tablets and mix in juice, applesauce, jelly, or pudding. (Check with your nurse or pharmacist first, because some pills can be dangerous if crushed or broken. Others react badly with certain foods or must be taken on an empty stomach.)



Swallowing Problems

- Avoid alcohol and hot, spicy foods or liquids.
- Avoid acidic foods, such as citrus fruits and drinks and fizzy soft drinks.
- Avoid hard, dry foods such as crackers, pretzels, nuts, and chips.
- Sit upright to eat and drink, and stay that way for a few minutes after meals.
- If you gag, cough, spit, feel pain or have other problems swallowing, try eating soft or liquid foods. You might be able to swallow thick fluids more easily than thin liquids. If you can't to eat enough regular foods to meet your nutritional needs, drink high-calorie and high-protein liquids.
- If mouth pain is a problem, use a numbing gel or pain reliever, such as viscous lidocaine (by prescription) or ask about taking pain medicine before eating.
- Ask about seeing a speech-language pathologist or swallowing therapist. These are health professionals who can teach you how to swallow better and how to decrease coughing and choking when you eat and drink.



Taste and Smell Changes

What the patient and caregiver can do

- Try using plastic forks, spoons, and knives and glass cups and plates.
- Try sugar-free lemon drops, gum, or mints.
- Try fresh or frozen fruits and vegetables instead of canned.
- Season foods with tart flavors. Use **lemon wedges**, **lemonade**, citrus fruits, vinegar, and pickled foods. (If you have a sore mouth or throat, do not do this.)
- Try flavoring foods with new tastes or spices (**onion**, **garlic**, **chili powder**, **basil**, **oregano**, **rosemary**, **tarragon**, **BBQ sauce**, **mustard**, **ketchup**, or **mint**).
- **Counter a salty taste with added sweeteners, a sweet taste with added lemon juice and salt, and a bitter taste with added sweeteners.**
- **Rinse your mouth with a baking soda, salt, and water mouthwash before eating to help foods taste better. (Mix 1 teaspoon salt and 1 teaspoon baking soda in 4 cups of water. Shake well before swishing and spitting.)**
- Keep your mouth clean and brush your teeth to help ease bad tastes.



Taste and Smell Changes

- Serve foods cold or at room temperature. This can decrease the foods' tastes and smells, making them easier to tolerate.
- Freeze fruits like cantaloupe, grapes, oranges, and watermelon, and eat them as frozen treats.
- Eat fresh vegetables. They may be more tempting than canned or frozen ones.
- Try marinating meats to make them tender.
- If red meats taste strange, try other protein-rich foods like chicken, fish, beans or peas, tofu, nuts, seeds, eggs, or cheese.
- Blend fresh fruits into shakes, ice cream, or yogurt.
- To reduce smells, cover beverages and drink through a straw; choose foods that don't need to be cooked; and avoid eating in rooms that are stuffy or too warm.



Misconceptions



- Diet for low Blood count
- Megadosing: The “More is better”
- The “Natural is safe” and “Natural is better”
- The “It’s been used for thousands of years, so it must work”
- The “It can’t hurt to take supplements along with my regular medicines”
- “The FDA wouldn’t let them make that claim if it wasn’t true” myth, and the “If it could hurt you they wouldn’t be allowed to sell it”
- Soy products
- Milk
- Some Special foods
- Vegan

مشخصات کیس



آقای ۶۳ ساله، مبتلا به کنسر کولون، جراحی جهت تخلیه تومور، شیمی درمانی طی ۳ دوره کاهش وزن ۱۰ کیلوگرم تا قبل از جراحی، و کاهش وزن ۶ کیلوگرم بعد از ترخیص از بیمارستان، بی اشتها، درد شکم، خستگی، بیخوابی، اسهال، دهان خشک

داروها: FOLFOX /Hydrochlorothiazide /Metoclopramide

مکمل ها: MultivitaminMineral /vit A

Actual BW:65 kg

Ht: 1.7m

FBS:98

K:3.8

Na:138

Cr:0.6

حل کیس

BMI= 22.4

Energy= (25-30)*BW=1650-1950

Protein=1.5*65=98g

- بیمار دهیدراته ؟
- افزایش تعداد وعده، کاهش حجم
- افزایش دانسیته کالری و پروتئین؟
- محدودیت قندهای ساده
- خشکی دهان؟
- فعالیت بدنی؟
- بررسی علل بیخوابی؟
- پروبیوتیک؟
- ریفیدینگ سندرم؟
- مکمل؟



Thanks for your attention!