

Nutrition

A vital source of resilience

Gina Giebner

The Rehab Dietitian Ltd

'Malnutrition negatively impacts on quality of life and treatment toxicities, and it has been estimated that up to 10-20% of cancer patients die due to consequences of malnutrition rather than for the tumor itself.'

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ESPEN Guideline

ESPEN practical guideline: Clinical Nutrition in cancer

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Topics

- Prevention
 - Nutritional prehabilitation
- Nutrition during cancer treatments
 - Impact on outcomes
 - Synergies
 - Contraindications
 - Any other common concerns
- Cachexia and nutrition

Prevention - WCRF

WCRF continuous update reports

- <https://www.wcrf.org/diet-and-cancer/cancer-types/>
- <https://www.wcrf.org/diet-and-cancer/cancer-prevention-recommendations/>
- <https://www.wcrf.org/diet-and-cancer/interactive-cancer-risk-matrix/>



SUMMARY OF STRONG EVIDENCE ON DIET, NUTRITION, PHYSICAL ACTIVITY AND THE PREVENTION OF CANCER

To reference this matrix please use the following citation:

World Cancer Research Fund/ American Institute for Cancer Research. Continuous Update Project: Diet, Nutrition, Physical Activity and the Prevention of Cancer. Summary of Strong Evidence. Available at: wcrf.org/cupmatrix accessed on DD-MM-YYYY

Abbreviation: SLR, systematic literature review.

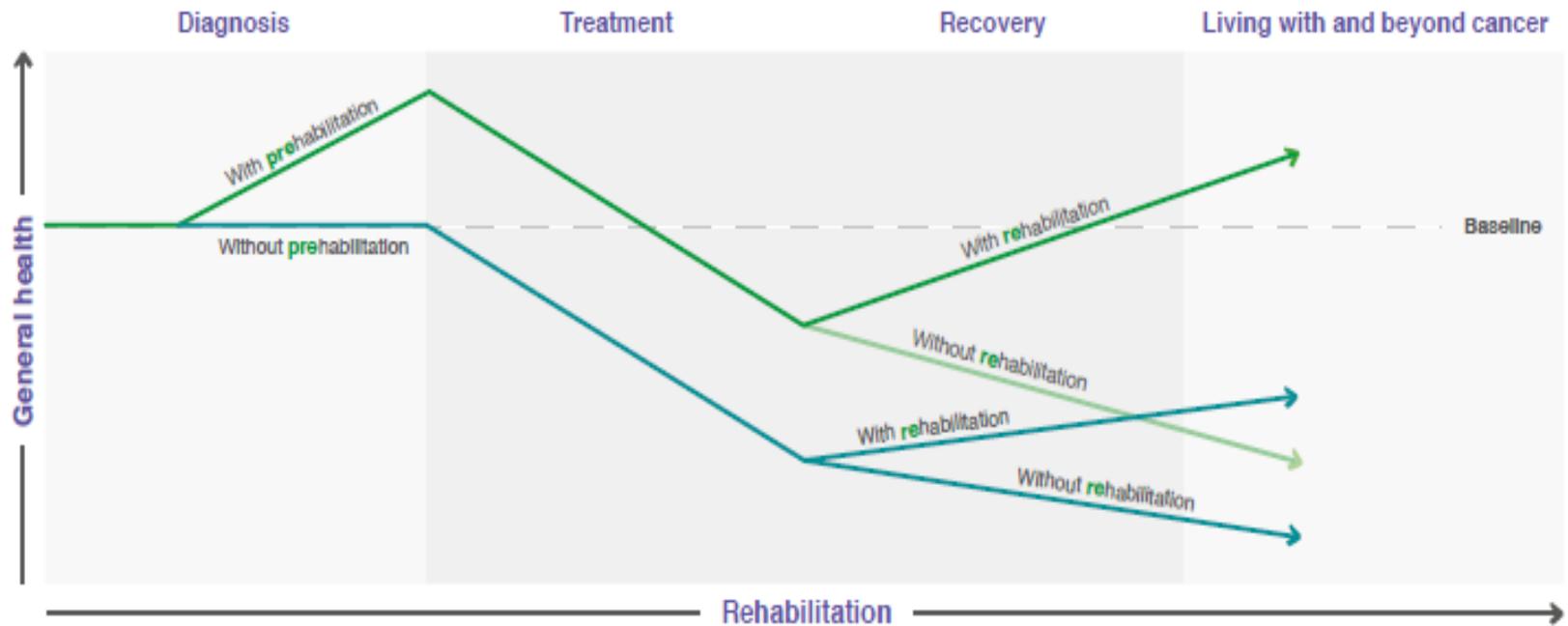
	Wholegrains	Foods containing dietary fibre	Aflatoxins	Foods containing beta-carotene	Non-starchy vegetables or fruit (aggregated) ²	Red meat	Processed meat	Cantonese-style salted fish	Dairy products	Foods preserved by salting	Arsenic in drinking water	Mate	Coffee	Sugar sweetened drinks	Alcoholic drinks	'Mediterranean type' dietary pattern	'Western type' diet	'Fast foods'	Glycaemic load	High-dose beta-carotene supplements	Beta-carotene	Calcium supplements	Physical activity (moderate and vigorous)	Vigorous physical activity	Walking	Screen time (children) ¹⁵	Screen time (adults) ¹⁶	Adult body fatness ¹⁸	Body fatness in young adulthood ¹⁹	Adult weight gain	Adult attained height ²¹	Greater birthweight	Lactation ²²	Having been breastfed			
MOUTH, PHARYNX, LARYNX 2018																																					
NASOPHARYNX 2017 (SLR)																																					
OESOPHAGUS (ADENOCARCINOMA) 2016																																					
OESOPHAGUS (SQUAMOUS CELL CARCINOMA) 2016																																					
LUNG 2017																																					



Performance Physiology

https://www.macmillan.org.uk/_images/prehabilitation-for-people-with-cancer_tcm9-353994.pdf

IMPROVING CANCER CARE BEFORE TREATMENT EVEN STARTS



Some data from

<http://www.medicalnutritionindustry.com>



Cancer patients are at higher risk of malnutrition: 1 in 3 cancer patients are malnourished¹



Malnutrition in cancer patients costs an estimated €17 billion/year in the EU²

Malnutrition prevalence in certain cancer types¹:

Cancer type	Overall prevalence of malnutrition %
Upper digestive	49,5%
Head and neck	45,6%
Lung	40,2%
Haematological	34,2%
Gynaecological	32,0%
Colorectal	31,2%
Breast	18,3%

1. Better care through better nutrition: value and effects of medical nutrition - A summary of the evidence base
https://medicalnutritionindustry.com/files/user_upload/documents/medical_nutrition/2018_MNI_Dossier_Final_web.pdf
2. The economic costs of disease related malnutrition Freijer, Karen et al. (Clinical Nutrition, Volume 32, Issue 1, 136 – 141)
[https://www.clinicalnutritionjournal.com/article/S0261-5614\(12\)00132-X/fulltext](https://www.clinicalnutritionjournal.com/article/S0261-5614(12)00132-X/fulltext)

What are the consequences of malnutrition for cancer patients?



Muscle loss



Increased toxicity from chemotherapy



Reduced tolerance to anticancer therapy



Reduced independence and quality of life



Higher complications and risk of infections



Longer hospital stay greater than 3 days³



Increased mortality

Good nutritional care can deliver better health outcomes and save costs¹



Weight gain or maintenance



Decreased interruption rate of oncology therapy



Improved response to anticancer therapy

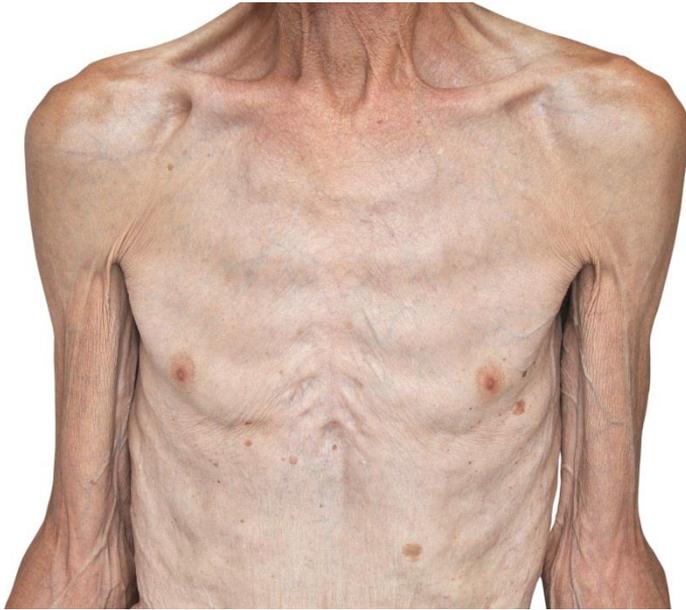


Nutritional interventions allow for cost savings to the healthcare systems

1. Better care through better nutrition: value and effects of medical nutrition - A summary of the evidence base

https://medicalnutritionindustry.com/files/user_upload/documents/medical_nutrition/2018_MNI_Dossier_Final_web.pdf

Malnutrition



Role of Sarcopenia

Sarcopenia Definition ‘progressive & general loss of skeletal muscle mass’ impacting function, reducing physical performance, contributing to frailty.

- Cruz-Jentoft A, et al. Sarcopenia: revised European consensus on definition and diagnosis. *Age Ageing*. 2019; 48(1): 16-31.
- Anker SD, Morley JE, von Haehling S. Welcome to the ICD-10 code for sarcopenia. *J Cachexia Sarcopenia Muscle*. 2016; 7(5):512-514.
- Cruz-Jentoft A, Sayer A. Sarcopenia. *The Lancet*. 2019; 393(10191): 2636-2646

Definitions and differences

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

Malnutrition in patients with cancer: anorexia, cachexia, and sarcopenia. Anorexia, with poor food intake and consequent weight loss, commonly occurs in disease-related malnutrition, especially cancer. These harmful changes are driven by proinflammatory cytokines and tumor-derived factors. The associated conditions of cachexia and sarcopenia may also be present or may develop as cancer advances—cachexia due to inflammation, and sarcopenia due to fatigue and low physical activity and to other causes of declining muscle mass and function. Abbreviations: Central nervous system, CNS; gastrointestinal, GI.

Data – Sarcopenia on outcomes

- In a systematic review of patients with pancreatic cancer (10 global and EU studies; N=1,685), the prevalence of sarcopenia ranged from 16.2% to 67% in patients who were overweight or obese (BMI >25 kg/m²), other studies have found high rates of sarcopenia in other cancer groups
 - Studies of sarcopenia and mortality also show that the risk of mortality increases with skeletal muscle mass loss.
 - A systematic review, in patients with cancer showed that in 10 studies (N=5,202), low skeletal muscle index (SMI) was associated with shorter overall survival (OS).
 - Another systematic review and meta-analysis of patients with solid tumours (37 studies N=7,779) showed that low SMI (vs high SMI) was associated with significantly poorer OS (HR 1.44 [95% CI: 1.32 to 1.56], p<0.001).
 - A systematic review assessing the impact of computed tomography (CT)-assessed sarcopenia on outcomes (13 studies, N=2,884), found that sarcopenia was a significant independent predictor for reduced OS .
 - In a study of Italian and German patients with cancer (N=1,084), low creatinine height index (a body composition parameter) was independently associated with increased mortality. In Italian patients, there was an 84% increased risk of mortality (HR 1.84 [95% CI: 1.18 to 2.86], p=0.007), and in German patients there was a 52% increased risk (HR 1.52 [95% CI: 1.17 to 2.07], p=0.008).
 - In a meta-analysis of 53 studies, including EU studies (N=14,295), preoperative sarcopenia was associated with an increased risk of severe postoperative complications
-
- Ozola Zalite I, Zykus R, Francisco Gonzalez M, Saygili F, Pukitis A, Gaujoux S, et al. Influence of cachexia and sarcopenia on survival in pancreatic ductal adenocarcinoma: A systematic review. *Pancreatology*. 2015;15(1):19-24.
 - Abbass T, Dolan RD, Laird BJ, McMillan DC. The relationship between imaging-based body composition analysis and the systemic inflammatory response in patients with cancer: A systematic review. *Cancers (Basel)*. 2019;11(9).
 - Shachar SS, Williams GR, Muss HB, Nishijima TF. Prognostic value of sarcopenia in adults with solid tumours: A meta-analysis and systematic review. *Eur J Cancer*. 2016;57:58-67.
 - Levolger S, van Vugt JL, de Bruin RW, J.N II. Systematic review of sarcopenia in patients operated on for gastrointestinal and hepatopancreatobiliary malignancies. *The British journal of surgery*. 2015;102(12):1448-58.
 - Pedrazzoli P, Caccialanza R, Stobaus N, Turri A, Klersy C, Caraccia M, et al. Validation of a new prognostic body composition parameter in cancer patients. *Journal of Clinical Oncology*. 2019;37(Supplement 15)
 - Weerink LBM, van der Hoorn A, van Leeuwen BL, de Bock GH. Low skeletal muscle mass and postoperative morbidity in surgical oncology: a systematic review and meta-analysis. *Journal of Cachexia, Sarcopenia and Muscle*. 2020((de Bock) Department of Epidemiology, University of Groningen, University Medical Center Groningen, Groningen, Netherlands).

How can nutrition improve sarcopenia

- Nutritional support may be comprised of nutritional and dietary coaching, with or without artificial nutrition; either oral nutritional supplementation (ONS), enteral tube feeding (ETF) or parenteral nutrition (PN).
- Nutritional coaching considers a patient's nutritional history, diagnosis, ability and psychosocial aspects around nutrition.
- The aim is to meet nutrition energy and protein & micronutrient needs alongside exercise considering losses and any deficiency states
- Randomized controlled trials suggest a critical role for dietary intake of protein in preventing sarcopenia and muscle loss, although the optimal dose and type of protein is unknown.
- There is some promising data regarding **vitamin D's** role and sarcopenia, but it is unclear whether the dose, frequency of dose, or length of treatment impacts the efficacy of vitamin D on improving muscle mass or function. **Selenium, magnesium, and omega 3 fatty acids** have been studied as supplements in clinical trials and in the diet, appearing to demonstrate a potential association with physical activity and muscle performance in older individuals.
- Following the Mediterranean diet with higher consumption of fruits and vegetables has been associated with improved physical performance and protection against muscle wasting, sarcopenia, and frailty.

- Arends J, Baracos V, Bertz H, Bozzetti F, Calder PC, Deutz NEP, et al. ESPEN expert group recommendations for action against cancer-related malnutrition. Clin Nutr. 2017;36(5):1187-96.
- ESPEN practical guideline: Clinical Nutrition in cancer. Muscaritoli, M. Et al. Clinical Nutrition 40, 2021 2898-2913
- de Las Penas R, Majem M, Perez-Altozano J, Virizuela JA, Cancer E, Diz P, et al. SEOM clinical guidelines on nutrition in cancer patients (2018). Clin Transl Oncol. 2019;21(1):87-93.
- Caccialanza R, Pedrazzoli P, Cereda E, Gavazzi C, Pinto C, Paccagnella A, et al. Nutritional support in cancer patients: A position paper from the Italian Society of Medical Oncology (AIOM) and the Italian Society of Artificial Nutrition and Metabolism (SINPE). J Cancer. 2016;7(2):131-5.
- Ganapathy A, Nieves JW. Nutrition and Sarcopenia-What Do We Know?. Nutrients. 2020;12(6):1755

Tests and other factors to consider

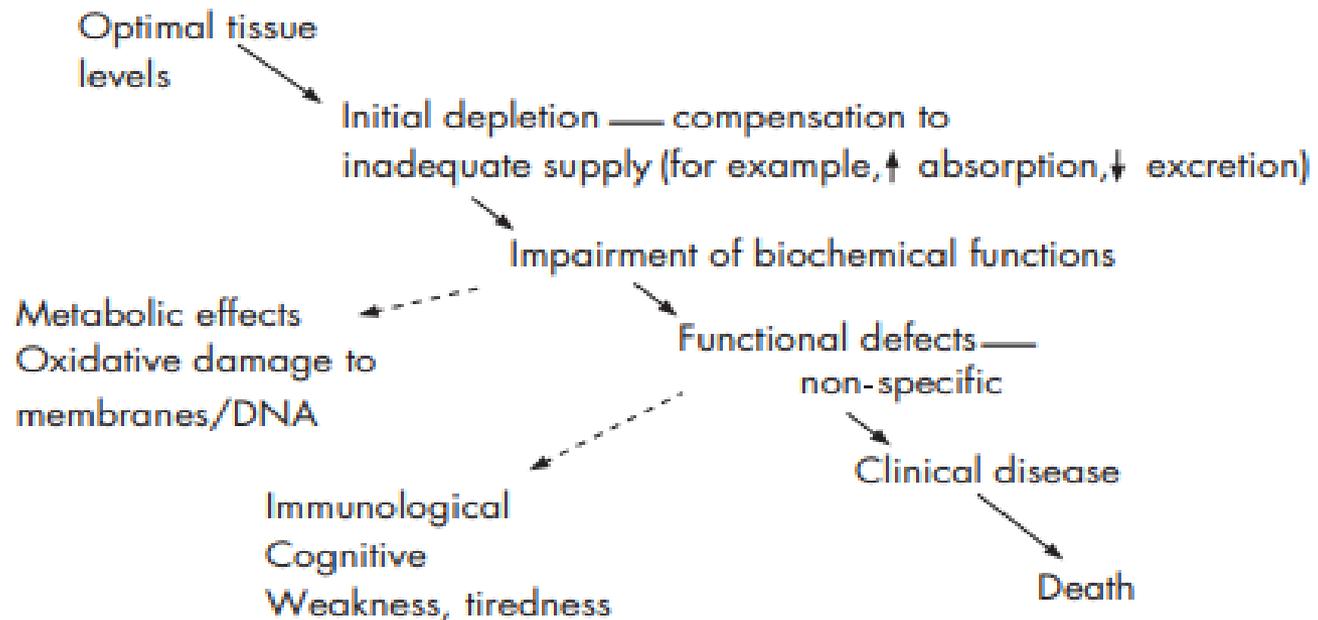
- Blood tests

Vitamin D, Iron Status tests

Others if malnourished/on certain medications/mal-digestion evident (magnesium, zinc, vitamin B₁₂, folate, selenium)

- Micronutrient recommendations – consider long term medications and conditions (e.g. alcohol use, diuretics, PPIs)
- Screening for malnutrition/sarcopenia/cachexia (consider frailty)
- Tests for sarcopenia [SARC-F](#) / CT scans, DEXA and bioimpedance
- Tests for cachexia
- Smoking
- Alcohol
- (exercise and emotional wellbeing discussed in other presentations)

Subclinical deficiency - Micronutrients



Shenkin, A. Postgrad Med J 2006;82:559–567

Examples

Micronutrient	Role	Effect of deficiency
Iron	Helps to make red blood cells, which carry oxygen around the body. It also helps the immune system to work and helps the brain to function normally	Anaemia. Fatigue, glossitis and paraesthesia
Vitamin D	Helps the body to absorb calcium and helps to keep bones strong. Helps muscles to function normally and the immune system to work.	Rickets, osteomalacia (bone pain and muscle weakness), growing evidence in multiple areas e.g. Covid-19 and other infections
Thiamine (vitamin B₁)	Helps to release energy from food. It also helps our nervous system and heart function normally	Beri-Beri – effect on peripheral nervous system, muscle weakness and atrophy. Cardiac failure and oedema. Wernicke-Korsakoff syndrome.
Zinc	Contributes to normal mental skills and abilities and helps to maintain normal hair, skin and nails. Helps with the normal healing of wounds and contributes to normal fertility and reproduction.	Delayed wound healing, impaired taste and smell. Skin disorders, alopecia
Vitamin B₁₂	Helps to make red blood cells, and therefore oxygen delivery. Helps the nervous system function normally. Helps keep our immune system working and helps to reduce tiredness	Pernicious anaemia. Nerve damage with spinal cord degeneration.

Iron replacement



ESMO > Guidelines > Supportive and Palliative Care

CLINICAL PRACTICE GUIDELINES – MANAGEMENT OF ANAEMIA AND IRON DEFICIENCY

Management of Anaemia and Iron Deficiency in Patients With Cancer: ESMO Clinical Practice Guidelines

Published in 2018 – Ann Oncol (2018) 29 (Suppl 4): iv96–iv110

Authors: *M. Aapro, Y. Beguin, C. Bokemeyer, M. Dicato, P. Gascón, J. Glaspy, A. Hofmann, H. Link, T. Littlewood, H. Ludwig, A. Österborg, P. Pronzato, V. Santini, D. Schrijvers, R. Stauder, K. Jordan and J. Herrstedt, on behalf of the ESMO Guidelines Committee*

Anaemia and iron deficiency are frequent complications in patients with solid tumours or haematological malignancies, particularly in patients treated with chemotherapeutic agents. These new ESMO Clinical Practice Guidelines provide tools

Related items

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<https://www.esmo.org/guidelines/supportive-and-palliative-care/anaemia-and-iron-deficiency-in-patients-with-cancer>

<https://www.learnhaem.com/courses/anaemia/lessons/iron-deficiency/topic/interpreting-iron-studies/>

Vitamin D replacement

- Use NICE or local guidelines for dose and prep
- Consider contraindications e.g. hypercalcaemia, metastatic calcification, renal impairment
- Standard advise = 10-25mcg per day



Cachexia and nutrition

Cachexia definition

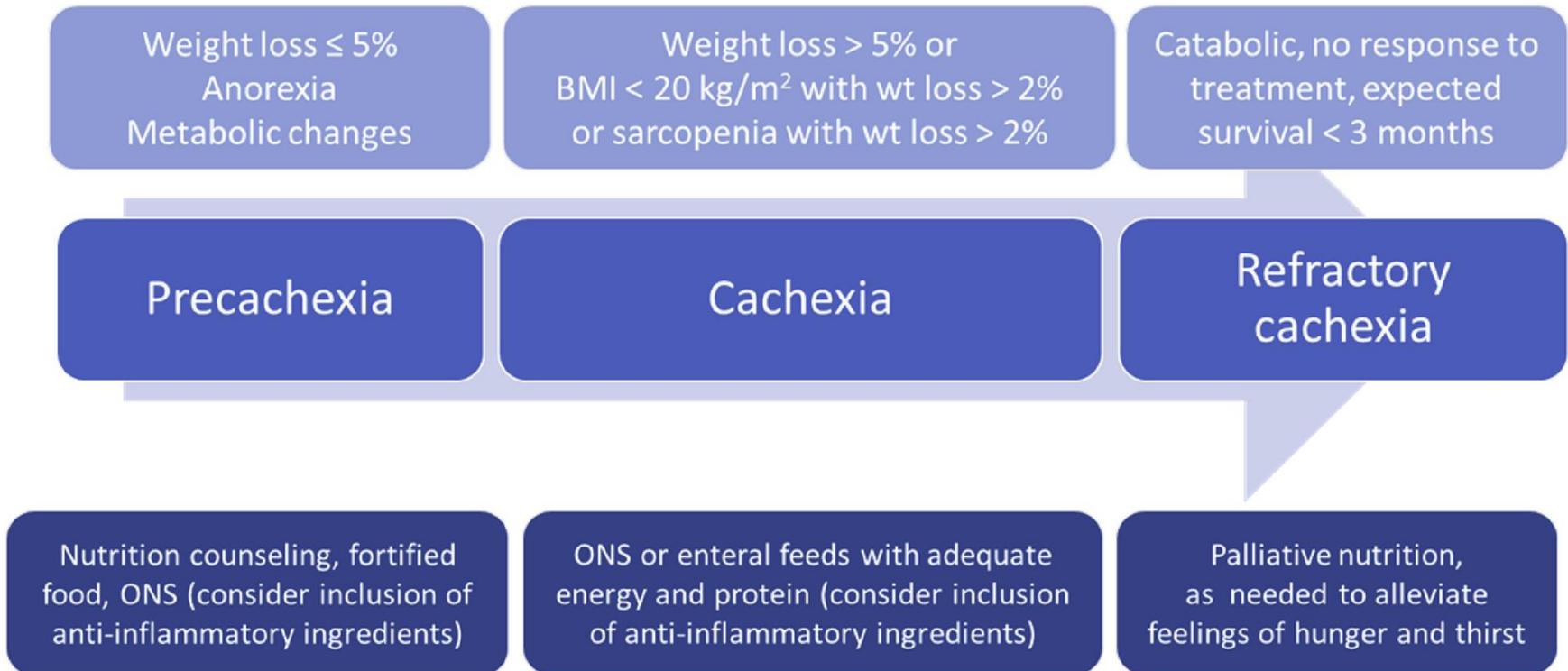
'Body weakness and wasting due to severe chronic illness' with an inflammation present

- Studies show inconsistent results with essential amino acids (including leucine) in managing cancer cachexia
- Oral nutritional supplements (ONS) are considered when nutritional coaching and recommended dietary measures don't achieve patients requirements ideally with coaching
- The ESPEN expert group recommend the consideration of ONS with anti-inflammatory ingredients.
- In a randomized study in patients with advanced colorectal cancer given 2 g fish oil daily during the first 9 weeks of chemotherapy showed time-to-tumor-progression was significantly longer for patients getting fish oil.
- Two studies with a complete oral nutritional supplement containing the omega-3 fatty acid eicosapentaenoic acid (EPA) for patients with lung cancer showed improvement in quality of life and physical function.
- Consider whole person and toleration
- Several trails currently underway within the UK & interest in gut health modulation



- Muscaritoli, M. Et al. Clinical Nutrition 40, 2021 2898-2913
- de Aguiar Pastore Silva J, Emilia de Souza Fabre M, Waitzberg DL. Omega-3 supplements for patients in chemotherapy and/or radiotherapy: a systematic review. Clin Nutr (Edinb) 2015;34:359e66.
- Ghoreishi Z, Esfahani A, Djazayeri A, Djalali M, Golestan B, Ayromlou H, et al. Omega-3 fatty acids are protective against paclitaxel-induced peripheral neuropathy: a randomized double-blind placebo controlled trial. BMC Canc 2012;12:355
- Fearon K, Strasser F, Anker SD, Bosaeus I, Bruera E, Fainsinger RL, et al. Definition and classification of cancer cachexia: an international consensus. Lancet Oncol 2011;12(5):489e95.
- Herremans KM, Riner AN, Cameron ME, Trevino JG. The Microbiota and Cancer Cachexia. Int J Mol Sci. 2019 Dec 12;20(24):6267

Phases of cachexia



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.

Arends J, Baracos V, Bertz H, Bozzetti F, Calder PC, Deutz NEP, et al. ESPEN expert group recommendations for action against cancer-related malnutrition. Clin Nutr. 2017;36(5):1187-96.

Nutrition in cachexia

- Higher fat proportion
- Meet protein needs
- Consider 2g omega 3 oils per day
- Mediterranean diet/Lower GI (insulin resistance)
- Realistic medicine

Useful tests

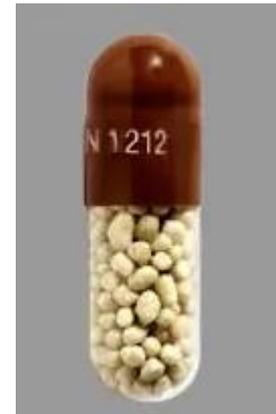
Cachexia diagnosis

- Inflammatory markers CRP, WBC, ESR, pro-inflammatory cytokines, neutrophil: lymphocyte ratio (NLR) from FBC
 - Hb and Albumin
 - History and diagnosis
 - Weight and body composition & function (sarcopenia)
 - Wt loss, hyper-metabolism, anorexia
 - HbA1c and markers of insulin resistance, triglycerides
-
- Kim EY, Kim YS, Seo JY, Park I, Ahn HK, Jeong YM, Kim JH, Kim N. The Relationship between Sarcopenia and Systemic Inflammatory Response for Cancer Cachexia in Small Cell Lung Cancer. PLoS One. 2016 Aug 18;11(8)
 - Derman BA, Macklis JN, Azeem MS, Sayidine S, Basu S, Batus M, Esmail F, Borgia JA, Bonomi P, Fidler MJ. Relationships between longitudinal neutrophil to lymphocyte ratios, body weight changes, and overall survival in patients with non-small cell lung cancer. BMC Cancer. 2017 Feb 16;17(1):141
 - Barker T, Fulde G, Moulton B, Nadauld LD, Rhodes T. An elevated neutrophil-to-lymphocyte ratio associates with weight loss and cachexia in cancer. Sci Rep. 2020 May 5;10(1):7535.
 - Tuomisto AE, Mäkinen MJ, Väyrynen JP. Systemic inflammation in colorectal cancer: Underlying factors, effects, and prognostic significance. World J Gastroenterol. 2019 Aug 21;25(31):4383-4404
 - Dev R. Measuring cachexia-diagnostic criteria. Ann Palliat Med. 2019 Jan;8(1):24-32.

Impact of cancer of nutrition

- Digestion altered
- Increased needs
- Appetite and psychology

- Examples
 - Head and Neck Cancers
 - Lung
 - Pancreatic
 - NETs
 - Peritoneal disease
 - Presence of ascites



Highlight on pancreatic cancer

- Dietetics, PERT and nutritional intervention early improved survival (10.2 months vs. 6.9 months; $p=0.015$) and pts where more likely to get SACT (65.8% vs. 50%; $p=0.03$)
 - Benefit of PERT on QoL, symptoms and survival
 - Consider diabetes Δ
 - Guidelines lines are available (Toouli et al 2010)
-
- McCallum L, Lamarca A, Valle J, et al. Prevalence of symptomatic pancreatic exocrine insufficiency in patients with pancreatic malignancy: nutritional intervention may improve survival. *Cancer Res Front* 2016;2:352–67
 - Valle JW, Palmer D, Jackson R, et al. Optimal duration and timing of adjuvant chemotherapy after definitive surgery for ductal adenocarcinoma of the pancreas: ongoing lessons from the ESPAC-3 study. *J Clin Oncol* 2014;32:504–12
 - Gooden HM, White KJ. Pancreatic cancer and supportive care-pancreatic exocrine insufficiency negatively impacts on quality of life. *Support Care Cancer* 2013;21:1835–41
 - Toouli J, Biankin AV, Oliver MR, et al. Management of pancreatic exocrine insufficiency: Australasian Pancreatic Club recommendations. *Med J Aust* 2010;193:461–7

What to implement

- Symptom control e.g. diarrhoea, pain, constipation, medication review
- Pre testing & screening (vitamin D, anaemia screen)
- Chronic disease management or risk e.g. diabetes, obesity and effect of treatment on this
- Sarcopenia and low BMI considerations
- Restrictive diets and use of supplements in prehabilitation
- Practical nutrition

ESPEN practical guidelines 2021

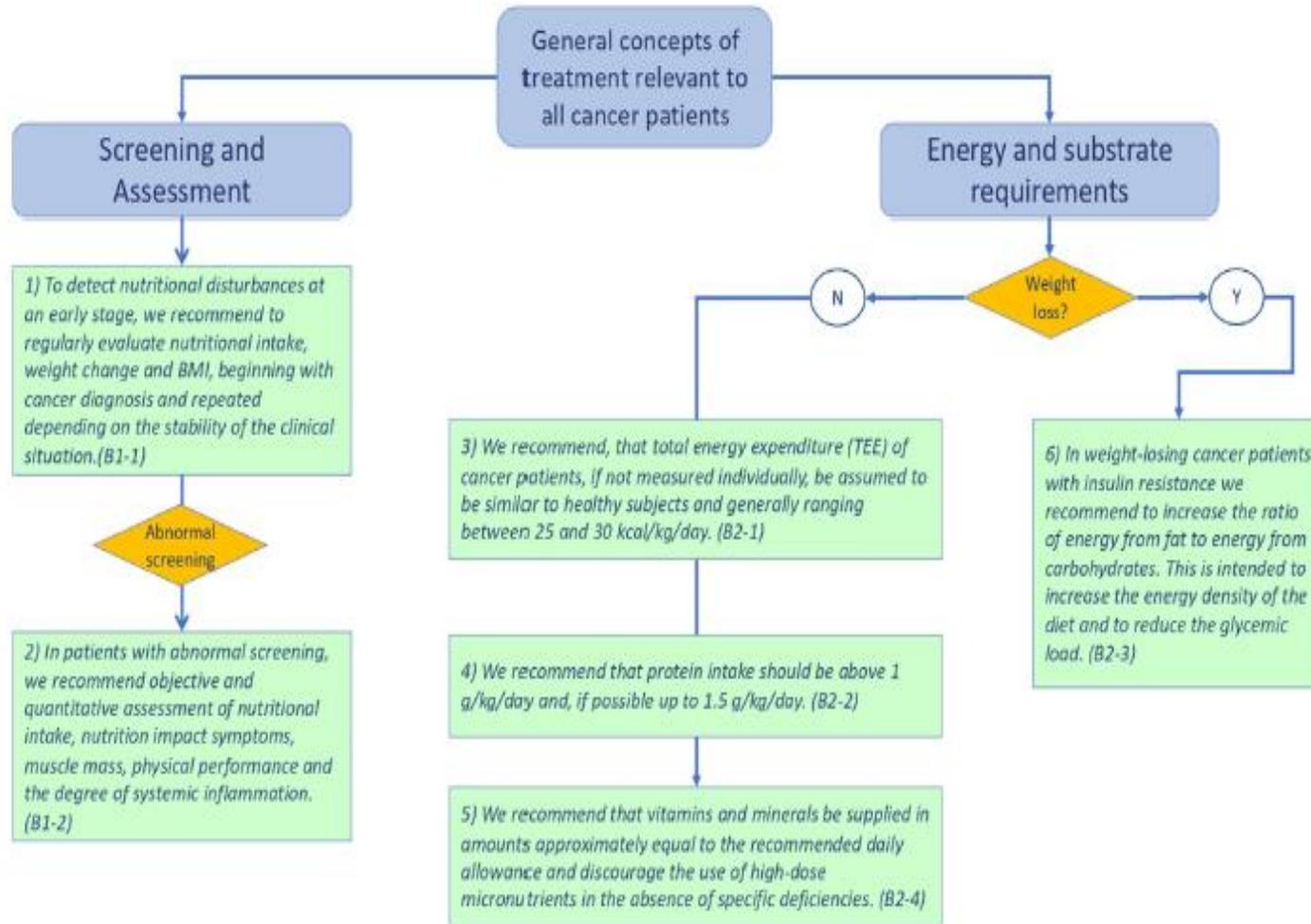
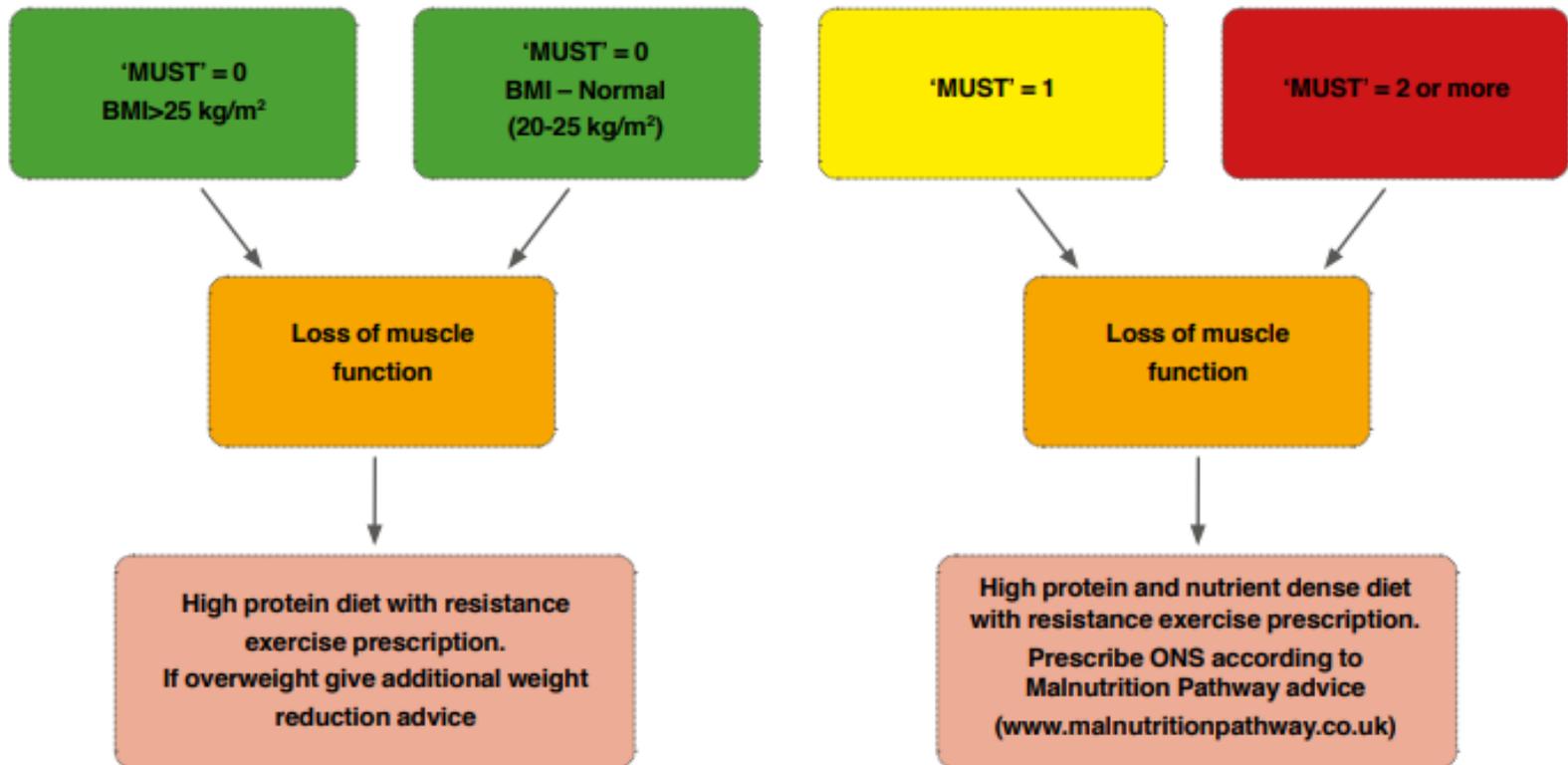


Fig. 2. General concepts of treatment relevant to all cancer patients: screening and assessment; energy and substrate requirements.

Nutrition for prehab

Figure 2: Managing malnutrition and sarcopenia in the community:



<https://www.malnutritionpathway.co.uk/sarcopenia>

Meeting these needs

- Protein 1.2-1.5g per day if exercising (1-1.2g/kg per day if not)
- 25-30g protein at each meal suggested for muscle building (with whey protein; found in dairy foods such as milk, yogurt and cheese showing muscle protein synthesis stimulation in studies)
- 20 g of protein = 3 eggs or a 100 g steak or 500 ml of milk or 80 g of peanut butter ?how easy is this to do?
- Consider BMI and renal function
- Before bed snacks, minimise fasting
- Energy
- Micronutrients & Omega 3 oils (2g per day in cachexia)



- Deutz NE, Wolfe R. Is there a maximal anabolic response to protein intake with a meal? Clin Nutr. 2013; 32(2): 309-313.
- Scientific Advisory Committee on Nutrition (SACN). SACN statement on nutrition and older adults living in the community. 2021.
- Bauer J, et al. Evidence-based recommendations for optimal dietary protein intake in older people: a position paper from the PROT-AGE Study Group. J Am Med Dir Assoc. 2013; 14(8): 542-559.
- Mamerow MM, et al. Dietary protein distribution positively influences 24-h muscle protein synthesis in healthy adults. J Nutr. 2014; 144(6): 876-880.
- Paddon-Jones D, Leidy H. Dietary protein and muscle in older persons. Curr Opin Clin Nutr Metab Care. 2014; 17(1): 5-11.
- Atherton PJ, et al. Muscle full effect after oral protein: time-dependent concordance and discordance between human muscle protein synthesis and mTORC1 signalling. Am J Clin Nutr. 2010; 92(5): 1080-1088.

Gut health and prehabilitation

- Prebiotics and Probiotics
- Consider timing and dose
- Contraindications of prebiotics
- Contraindications of probiotics

The International Scientific Association for Probiotics and Prebiotics defines “probiotics” as “live microorganisms that, when administered in adequate amounts, confer a health benefit on the host”

- Prebiotics feed the bacteria and make the gut environment better for growth of beneficial bacteria
- BSIO recommendations <10billion colony forming units/CFU per day on Tx

Prebiotics

- Leeks
- Garlic
- Onions
- Jerusalem artichokes
- Asparagus
- Legumes (beans and lentils)
- Banana
- Chicory root
- Flaxseed/linseeds
- Seaweed
- Cabbage

Probiotics

- Live yoghurts
- Kimchi
- Fermented products (live)
- Kefir
- Supplements



Nutrition during treatment

- Surgery
- Radiotherapy
- SACT (systemic anti-cancer therapy)
- Combined effect

Impact on outcomes

Delayed Tx

Dose reduction

Not fit for Tx

- Side effects that impact on nutrition
 - Nausea
 - Mucositis
 - Diarrhoea
 - Constipation
 - Taste changes and dry mouth
 - Fatigue
 - Dysphagia
 - Pain
 - Mal-digestion
 - Appetite changes
 - Ascites

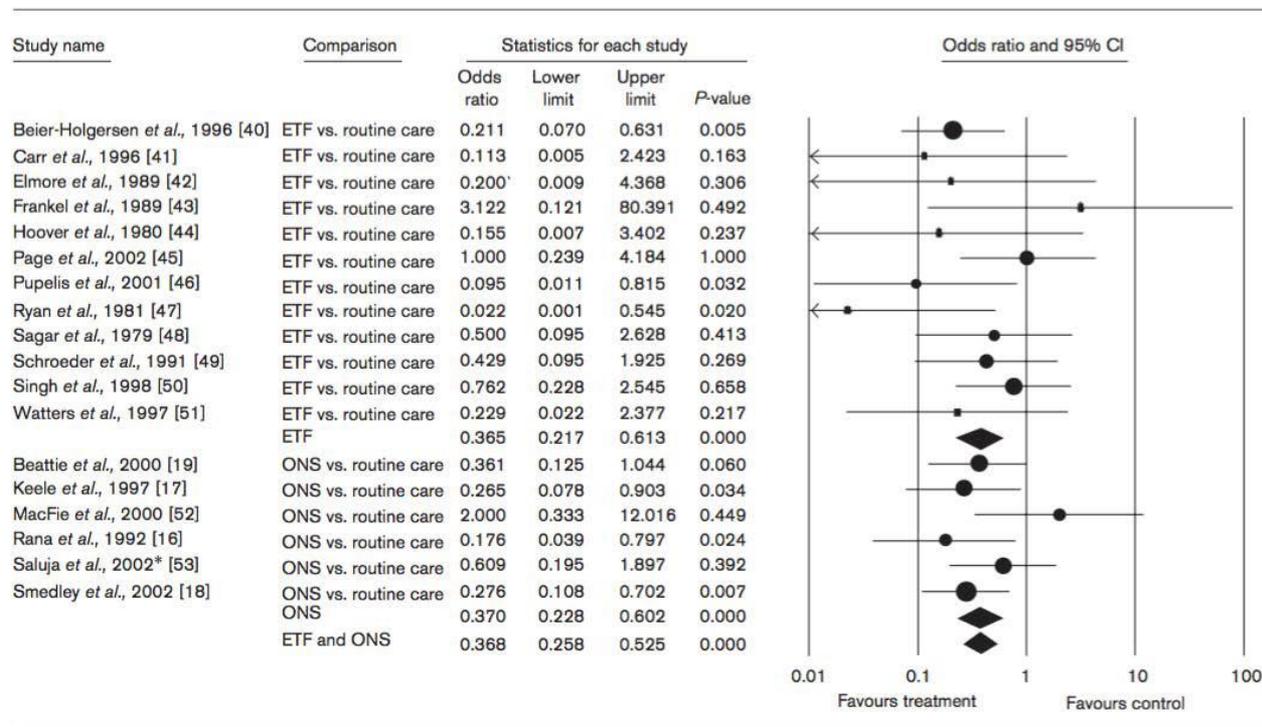
Some evidence base – lung cancer

- Weight loss/malnutrition is common in lung cancer patients at diagnosis including prior to radical radiotherapy approx. 30%
- **Weight loss prior to radical radiotherapy negatively impacts on survival** *Unsal et al. Am J Clin Oncology 2006 p 183*
- Approx. 30% of patients lose >5% wt during Tx. This can continue following completion of Rx. EARLY and intensive dietary counselling in lung cancer pts receiving chemo-Rad resulted in
 - Wt gain and fat free mass gain
 - improved physical and functional wellbeing scores*Kiss et al Clin. Nutri 2014 p. 1074*
- **Weight loss is independently associated with reduced survival, increased toxicity to anticancer treatment and reduced quality of life.** *Arends et al Clin Nutr 2016 p. 1*
- **Weight loss associated with poorer prognosis.** *Topkan et al Int J Radiat Oncol. 2013 p 677*

GI surgery

Postop complications are fewer with ONS or Enteral Tube Feeding
 R 0.37 (0.26-0.53)

Fig. 1



Meta-analysis (18 randomized controlled trials, $n=907$) shows fewer complications with enteral nutrition (oral nutritional supplements and tube feeding) in gastrointestinal surgical patients. *Study uses a 'home-made' supplement. CI, confidence interval; ETF, enteral tube feeding; ONS, oral nutritional supplements.

Tx Toxicity

Chemotherapy toxicity can also be improved by medical nutrition.

- Colorectal cancer undergoing chemotherapy (N=47),
haematological toxicities 86% vs 29% of patients and GI toxicities 94% vs 29% in those with improved nutritional intake
- Head and neck cancer undergoing chemo-radiotherapy (N=66)
Toxicity-related breaks in radiotherapy >5 days and days of radiotherapy delayed for toxicity were both significantly less likely in patients who were referred for early nutritional intervention (ONS or ETF), compared with patients who did not receive a specifically designed early nutrition support (30.3% vs 63.6%, $p < 0.01$, and 4.4 ± 5.2 vs 7.6 ± 6.5 , $p = 0.038$, respectively)

Paccagnella A, Morello M, Da Mosto MC, Baruffi C, Marcon ML, Gava A, et al. Early nutritional intervention improves treatment tolerance and outcomes in head and neck cancer patients undergoing concurrent chemoradiotherapy. *Supportive Care in Cancer*. 2010;18(7):837-45.

Mazzuca F, Roberto M, Arrivi G, Sarfati E, Schipilliti FM, Crimini E, et al. Clinical impact of highly purified, whey proteins in patients affected with colorectal cancer undergoing chemotherapy: Preliminary results of a placebo-controlled study. *Integrative Cancer Therapies*. 2019;18((Muscaritoli) Sapienza University, Rome, Italy).

My personal case examples

Prehab & Tx

- Post ileostomy malnutrition delayed chemotherapy
- Oesophageal Cancer chemotherapy Tx delayed until wt loss stabilised
- Surgery delay due to low BMI and increased risk
- Hyperglycaemia admission and delayed Tx

Nutritional Synergies during Tx

- Optimising muscle and weight
- Optimising micronutrients (recovery and bloods), magnesium and phosphate considerations on SACT
- CBGs on steroids
- Blood health
- Patient empowerment and family roles
- Reinforcing behaviours for rehabilitation and life long wellbeing

Tips

Nutrition care tips

- Consider side effect & contraindications
- Consider likes and beliefs
- Consider budget – be practical
- Consider emotional aspects

Symptom	Tip
Nausea	Medication timing, plain foods frequently, good hydration, avoid smells, cold foods
Dry mouth	Hydration, salvia sprays, citrus, sours
Mucositis	Food consistency and temperature changes
Pain	Medication review and timing
Diarrhoea	Medication review, hydration and electrolytes, fibre modification
Constipation	Medication review, hydration, fibre modification and food laxatives, kiwi, linseeds

Tx tips

Tx problem	Nutrition Tip
High outpt stoma	Diet and medication – thickening foods, lower insoluble fibre, fluid management, electrolytes
High CBGs	Diet and medication management – low GL diet (monitor) see next page
Low volume appetite (e.g. ascites)	Higher nutrient value foods, eating more frequently, easy to eat foods
Bowel obstruction +/- vomiting	Hydration, lower fibre, modified consistency, liquid diets, medication

JBDS-IP Joint British
Diabetes Societies
for inpatient care



UK CHEMOTHERAPY BOARD

The Management of Glycaemic Control in Patients with Cancer

Guidance for the diabetes and oncology
multidisciplinary teams

Report of a working party on behalf of the
UK Chemotherapy Board and
Joint British Diabetes Societies
for Inpatient Care

May 2021



DIABETES UK
KNOW DIABETES. FIGHT DIABETES.



UKCPA
CLINICAL PHARMACY ASSOCIATION

<https://abcd.care/resource/management-glycaemic-control-patients-cancer>

Contraindications

- Obstruction risk
- Malnutrition
- Dysphagia
- Sarcopenia
- Hypoglycemia
- Liver disease and use of supplements/herbs
- Eating disorders

Other common concerns Tx

- Being encouraged to have an 'unhealthy diet'
- Micronutrient supplements
- Pre and probiotics
- Neutropenic diets
- Other supplements

Pragmatic approach – harm vs benefit

Useful websites

- Herbs and supplement database [Sloan Kettering Institute Herbs database](#)
- Patient information leaflet and recipes [WCRF Eating Well During Cancer](#)
- Protein and other resources for malnutrition <https://www.malnutritionpathway.co.uk/library/protein.pdf>

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