



NUTRITION SUPPORT MEASURES IN OESOPHAGEAL CANCER

Early nutrition interventions are key in oesophageal cancer, with guidelines recommending pathways using grading tools in particular for dysphagia and malnutrition. This article examines the impact of nutritional screening and the treatment options for this patient group.

Oesophageal cancer refers to tumours starting in the oesophageal mucosa, which can progress locally to involve the underlying submucosa and muscular layer and eventually invading adjacent structures such as the tracheobronchial tree, laryngeal nerve, thoracic aorta or diaphragm.¹

Oesophageal cancer is the 14th most common cancer in the UK, accounting for 3% of all new cancer cases in 2017. It occurs predominately in the older population with approximately 4 in 10 (41%) of all new oesophageal cancer cases each year occurring in individuals 75 years of age, with prevalence higher in men. Survival rates for oesophageal cancer remain low with only 15% diagnosed predicted to survive for at least five years.²

Risk factors for the development of oesophageal adenocarcinoma include obesity, gastrooesophageal reflux disease and subsequent Barrett's oesophagus,

whilst smoking and history of alcohol excess are the main risk factors for the development of squamous cell carcinoma.³

Chronic irritation to the oesophagus, such as thermal and/or mechanical injury, achalasia, oesophageal diverticulum, tylosis and Plummer-Vinson syndrome, also influences the development of squamous cell carcinoma.⁴

DISEASE EFFECTS ON NUTRITION

Malnutrition affects up to 80% of patients with oesophageal cancer with or without cachexia and is multifactorial in aetiology. Less than 60% of individuals have resectable and potentially curative disease.⁵ Late presentation with obstructive symptoms such as dysphagia (usually arising when less than 1.5cm of oesophageal lumen remain) and odynophagia with weight loss due to locally advanced disease, is commonly observed.⁶ The degree of dysphagia



Lauren Roberts
HPB/UGI Lead
Oncology Dietitian,
The Clatterbridge
Cancer Centre, Wirral

Lauren has been a Registered Dietitian for seven years, working in the NHS. She has spent the past five years working in the field of oncology, more recently specifically with oesophago-gastric cancers and hepatopancreaticobiliary cancers.

Table 1: Oesophageal dysphagia grading tool

Dysphagia score	Description
0	No dysphagia
1	Able to swallow normal consistency diet
2	Able to swallow soft/semi solid diet
3	Able to swallow liquids only
4	Unable to swallow liquids/total dysphagia

Table 2: Common side effects of chemotherapy and radiotherapy that impact on nutritional status

Chemotherapy side effects	Radiotherapy side effects
Stomatitis	Oesophagitis
Taste changes	Odynophagia
Nausea	Worsening dysphagia
Vomiting	Mucositis
Anorexia	Taste changes
Fatigue	Fatigue
Changes in bowel pattern	

can be graded as outlined in Table 1, and was initially utilised to describe swallow pre- and post-oesophageal stent insertion, but nowadays is adopted across the surgery and oncology setting to describe the level of dysphagia.⁷

IMPACT OF TREATMENT FOR OESOPHAGEAL CANCER

Multimodality treatment, whether intent is curative or non-curative, is now common practice. Treatments include surgery, chemotherapy, radiotherapy and oesophageal stenting. The cumulative effects of treatment and long duration, in addition to the symptoms of disease, can have a significant impact on the nutritional status and performance status of an individual; impeding further treatment if timely individualised nutritional intervention is not undertaken.⁸

Common side effects of chemotherapy and radiotherapy are highlighted in Table 2 and can significantly increase nutritional risk and influence nutritional status, particularly when given in combination. Weight loss prior to treatment increases the incidence of treatment-related dose-limiting toxicities, failure to complete treatment regimens and, therefore, impairs efficacy and can affect prognosis.^{9,10}

NUTRITIONAL SCREENING AND AIMS OF INTERVENTION

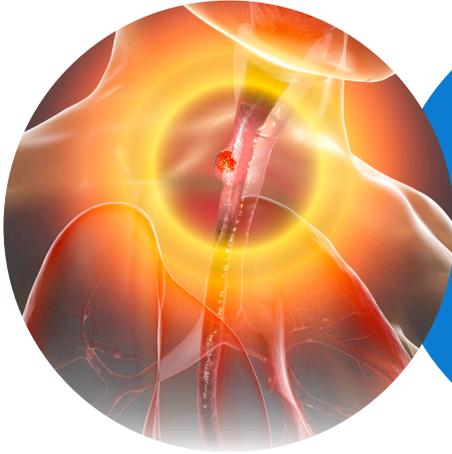
NICE guidelines published in 2018, recommend that nutritional assessment and tailored specialist dietetic support should be offered to all individuals with oesophago-gastric cancer before, during and after radical treatment. The guidelines also highlight the need for support from a specialist oncology dietitian for individuals with oesophago-gastric cancer receiving palliative treatment and care.¹¹

Arends et al (2006),¹² emphasised that individuals receiving radiotherapy to the GI tract, including the oesophagus, should be referred to a dietitian (grade A evidence). The guideline also suggests that these individuals should receive at least fortnightly intensive dietary counselling with combined oral nutritional supplementation during radiotherapy, with follow-up continuing for at least six weeks after completion of radiotherapy.¹²

A study by Cox et al (2016),⁶ which looked at nutritional prognostic factors and survival outcomes associated with nutrition intervention (dietary counselling, oral nutritional supplements and enteral nutrition) in the SCOPE 1 trial, identified that individuals with a nutrition risk index (NRI) of <100 (risk of malnutrition) at baseline strongly predicted reduced overall survival. Nutrition intervention at baseline improved survival but, interestingly, did not if provided later in the treatment course.⁶ This study reinforces the importance of nutritional prehabilitation and early nutritional intervention.

However, the strongest evidence for nutritional intervention improving outcomes is for individuals who are undergoing surgery. In individuals undergoing chemotherapy and radiotherapy, evidence is limited on how addressing their nutritional needs will impact on clinical outcomes such as response to treatment and mortality.

The aims of nutritional intervention during chemotherapy are to minimise the risk of toxicities as a result of weight loss, enable completion of oncology regimens at intended doses, whilst maintaining nutritional and functional status as well as quality of life. The Australian guidelines on dietetic intervention for radiotherapy recommend the following aims of



A post-hoc analysis found that studies offering both dietary counselling and oral nutritional supplements had the biggest effect.

nutrition intervention: to minimise weight loss, maintain quality of life and to provide symptom control for individuals undergoing radiotherapy and/or chemotherapy.¹³

ORAL NUTRITION SUPPORT AND ONCOLOGY TREATMENT

Nutritional counselling with or without nutritional supplements may be adequate to maintain nutritional status in patient's undergoing chemotherapy alone, eg, pre-op chemotherapy and palliative chemotherapy.¹² If dysphagia is present prior to pre-operative or palliative chemotherapy, on occasion it has been observed to improve on commencement of treatment, resulting in improved oral nutritional intake and maintenance or improvement of nutritional status. However, this is not the case for all individuals, thus reiterating the importance of individualised dietetic assessment and monitoring.

Grade A evidence guidelines from ESPEN for non-surgical oncology recommend the use of intensive dietary counselling and oral nutritional supplements to help increase oral dietary intake and to prevent therapy-associated weight loss and interruption of treatment.¹²

A systematic review and meta-analysis by Baldwin et al (2012),¹⁴ examined the evidence of the effects of dietary intervention (nutritional counselling, oral supplements, or both) in 1414 cancer patients who were malnourished or were at risk of malnutrition. No difference in survival was found. However, quality of life (QoL) was significantly improved (both when including

all studies and when removing the studies that accounted for high heterogeneity) on the global QoL scale and on the 'emotional functioning', 'dyspnoea', and 'loss of appetite' scales. The interventions were associated with statistically significant improvements in body weight (mean difference in weight $\frac{1}{4}$ 1.86kg, 95% confidence interval 0.25e3.47, $p \frac{1}{4}$ 0.02), but there was significant heterogeneity. The groups receiving nutritional therapy had a significantly greater energy intake than groups receiving routine care, again with high heterogeneity. A post-hoc analysis found that studies offering both dietary counselling and oral nutritional supplements had the biggest effect.

Similarly, another study found nutrition intervention in terms of dietary counselling and oral nutritional supplements beneficial on body weight.¹⁵ Subgroup analyses showed effects were driven by high-protein *n-3* PUFA-enriched ONS, suggesting a benefit to targeting metabolic alterations. However, further well-designed RCTs are required to determine the effect of nutrition interventions on nutritional and clinical outcomes.

ENTERAL NUTRITION SUPPORT AND ONCOLOGY TREATMENT

Enteral nutrition (EN), defined by NICE guidelines (2006) as delivery of nutritionally complete feed into the gut (stomach, duodenum or jejunum), should be considered in those individuals who are at risk of malnutrition or who are malnourished and have inadequate or

unsafe oral intake and a functional accessible gastrointestinal tract.¹⁶ EN should be considered where significant weight loss has occurred and/or where treatment and disease cause significant difficulty in achieving dietary intake.

Arends et al (2016) recommends artificial nutrition if individuals are unable to eat adequately, eg, no food for more than one week, or less than 60% of requirements met for more than one to two weeks, with EN being the preferred route if dietary intake remains inadequate despite nutritional interventions (counselling, oral nutritional supplements), and parenteral nutrition (PN) if EN is not sufficient or feasible.^{12,17}

For those individuals requiring tube feeding in oesophageal cancer, the types of feeding tubes used can vary in practice and depend on factors such as the stage of oesophageal cancer, level of obstruction and extent of dysphagia, patient and clinician preference and organisational guidelines.

Although guidelines, such as those from the National Nurses Nutrition Group (NNNG) suggest that nasogastric tube (NGT) placement is contraindicated in oesophageal cancer, in practice it is commonly used and often placed by experienced practitioners, under fluoroscopic guidance where necessary.¹⁸ Nasogastric or nasojejunal feeding tubes may be utilised if individuals are dysphagic and/or are unable to meet their nutritional needs orally to maintain or improve nutritional status prior to oesophageal surgery or during neo-adjuvant chemotherapy.

In individuals planned for curative surgery, all types of gastrostomy tube placement should be avoided to minimise the risk of compromising the stomach as an oesophageal substitute at oesophagectomy.¹⁹

A centre placing prophylactic jejunostomy feeding tube at diagnosis of oesophageal cancer demonstrated that 42% of individuals required artificial nutrition during neo-adjuvant chemotherapy, which led to significant weight gain compared to those individuals who did not feed.²⁰ A jejunostomy feeding tube may also be placed intraoperatively to support individuals in the post-operative period and on discharge from hospital as nutritional issues, malabsorption and weight loss are common in the months after surgery. Jejunostomy feeding

tubes can provide useful support, particularly if individuals go on to having adjuvant chemotherapy, helping minimise issues with poor treatment tolerance and toxicities due to weight loss, which can compromise completion of oncology treatment.

ESPEN guidelines on EN in non-surgical oncology advise that routine EN is not indicated during radiation (grade C evidence).¹² However, in one study, approximately 75% of patients undergoing chemo-radiation required EN.²¹ From practice and experience in this setting, requirement of EN varies depending on service provision to oesophageal cancer patients and frequency of monitoring by the MDT.

Odelli et al (2005) recommend gastrostomy placement prior to the commencement of chemo-radiation with weight loss of at least 10% and BMI <18, or where a patient is only able to manage pure consistency diet or less.²² Concerns have been raised regarding the placement of endoscopic gastrostomy tube insertion due to potential impassable tumour, stomach infiltration of oesophago-gastric junctional tumours and risk of introducing stoma metastases.^{23,24} However, in a retrospective analysis, PEG placement was successful in the majority of individuals prior to multimodality treatment for oesophageal cancer and was significantly related to attainment of target doses of chemo-radiotherapy and survival at 12 months.²⁵

LATE EFFECTS OF TREATMENT

Late effects of radiotherapy can include oesophageal structuring and stenosis due to tissue fibrosis. Oesophageal dilations and/or oesophageal stent placement can be used to manage these effects. Artificial feeding (enteral or parenteral) may be used as an interim measure until interventions have been implemented or in some cases in the long term if these interventions are not feasible, or repeated procedures are required, eg, repeated dilations, making it challenging for individuals to maintain consistent dietary adequacy.

NUTRITION IN PALLIATIVE CARE

Oesophageal stenting to relieve mechanical obstruction and restore oral intake may be used alone, instead of, or in combination

with, palliative radiotherapy or palliative chemotherapy. Dietetic input is vital in guiding individuals on the build-up of diet post stent insertion, whilst aiming to reduce the risk of stent blockage and restrictive eating patterns. EN or, if necessary, PN can be used in some circumstances as a short-term stepping stone to support nutritional intake until successful stent placement. In a small number of cases, stent placement may not be achievable, eg, due to location of disease and, thus, artificial enteral or parenteral feeding may be long term.

Complications of advanced oesophageal disease include trachea-oesophageal fistula and vocal cord palsy. Fistulas can lead to aspiration of oral intake and saliva into airways and, thus, a nil-by-mouth status and long-term artificial feeding is recommended until the fistula is sealed using an oesophageal and/or tracheal stent. Patients presenting with vocal

cord palsy should be assessed jointly with speech and language therapists to develop an individualised plan which may include the insertion of a long-term enteral feeding tube to ensure safe nutritional intake and help maintain or improve QoL.

SUMMARY

The prevalence of malnutrition and cachexia are high in oesophageal cancer due to obstructive symptoms associated with the disease and symptoms. Additionally, oncology treatments and side effects of these can exacerbate weight loss and loss of lean body mass, impacting on treatment tolerance and QoL. Early individualised dietetic assessment and intervention (dietary counselling, oral nutrition support, artificial feeding) is key with this patient group, as well as frequent monitoring within the multidisciplinary team.

References

- 1 Thrumurthy SG et al (2019). Oesophageal cancer: risks, prevention, and diagnosis. *BMJ*; 366: l4373
- 2 Cancer Research UK. Accessed 4th April 2020 from: www.cancerresearchuk.org/health-professional/cancer-statistics/statistics-by-cancer-type/oesophageal-cancer#heading=Zero
- 3 Ribeiro U et al (1996). Risk factors for squamous cell carcinoma of the oesophagus. *British Journal of Surgery Society*, 18 (9):1174-1185
- 4 Baus MF and Vaughan TL (2013). Epidemiology and risk factors for gastroesophageal junction tumours: understanding the rising incidence of this disease. *Seminars in radiation oncology*, 23 (1): 3-9
- 5 Ajani JA et al (2011). Esophageal and esophagogastric junction cancers. *Journal of the National Comprehensive Cancer Network*, 9 (8): 830-887
- 6 Cox S et al (2016). Role of nutritional status and intervention in oesophageal cancer treated with definitive chemoradiotherapy: outcomes from SCOPE1. *British Journal of Cancer*, 115 (2):172-177
- 7 Knyrim K et al (1993). A controlled trial of an expansile metal stent for palliation esophageal obstruction due to inoperable cancer. 329: 1302-1307
- 8 Lee JLC et al (2016). Nutrition intervention approaches to reduce malnutrition in oncology patients: a systematic review. *Supportive care in cancer*, 24: 469-480
- 9 Odelli C et al (2005). Nutrition support improves patient outcomes, treatment tolerance and admission characteristics in oesophageal cancer. *Clinical Oncology (R Coll Radiol)*, 17 (8): 639-645
- 10 Andreyev HJ et al (1998). Why do patients with weight loss have a worse outcome when undergoing chemotherapy for gastrointestinal malignancies? *European journal of cancer*, 34 (4): 503- 509
- 11 National Institute of Care and Excellence (2018). Oesophago-gastric cancer: assessment and management in adults. NG83. Accessed 30th March 2020 from: www.nice.org.uk/guidance/ng83/chapter/Recommendations#nutritional-support
- 12 Arends J et al (2006). ESPEN guidelines on enteral nutrition; non-surgical oncology. *Clinical Nutrition*, 25 (2): 245-259
- 13 Isenring et al (2013). Updated evidence-based practice guidelines for the nutritional management of patients receiving radiation therapy and/or chemotherapy. Accessed 4th April 2020 from: <http://onlinelibrary.wiley.com/doi/10.1111/1747-0080.12013.full>
- 14 Baldwin C et al (2012). Oral nutrition interventions in malnourished patients with cancer; A systematic review and meta-analysis. *Journal of the national cancer institute*, 104 (5); 371-385
- 15 De van der Schueren, MAE et al (2018). Systematic review and meta-analysis of the evidence for oral nutrition intervention on nutritional and clinical outcomes during chemo (radio) therapy: current evidence and guidance for design of future trials. *Annals of Oncology*, 29 (5); 1141-1153
- 16 National Institute of Care and Excellence (2006). Nutrition support in adults. CG32. Accessed 2nd April from: www.nice.org.uk/guidance/cg32/chapter/1-Guidance
- 17 Arends J et al (2017). ESPEN guidelines on nutrition in cancer patients. *Clinical Nutrition*, 36(1): 11-48
- 18 National Nurses Nutrition Group (2016). Good Practice Guideline – Safe Insertion of Nasogastric (NG) Feeding Tubes in Adults and Ongoing care. Accessed 9th April 2020 from: www.nnng.org.uk/wp-content/uploads/2016/06/NNNG-Nasogastric-tube-Insertion-and-Ongoing-Care-Practice-Final-April-2016.pdf
- 19 Westaby D et al (2010). The provision of a percutaneously placed enteral tube feeding service. *Gut*, 59 (12): 1592-1605
- 20 Jenkinson et al (2007). Laparoscopic feeding jejunostomy in esophagogastric cancer. *Surgical endoscopy*, 21 (2); 299-302
- 21 Heath EI et al (2000). Phase 2 evaluation of pre-operative chemoradiation and post-operative adjuvant chemotherapy for squamous cell and adenocarcinoma of the oesophagus. *Journal of clinical oncology*, 18 (4); 868-876
- 22 Odelli C et al (2005). Nutrition support improves patient outcomes, treatment tolerance and admission characteristics in oesophageal cancer. *Clinical oncology*, 17 (8); 639- 645
- 23 Grant DG et al (2009). Complications following gastrostomy tube insertion in patients with head and neck cancer: a prospective multi-institution study, systematic review and meta-analysis. *Clin Otolaryngol*, 34: 103-112
- 24 Coletti D et al (2006). Metastasis to the percutaneous endoscopic gastrostomy site in the patient with head and neck cancer: a case report and review of the literature. *J Oral Maxillofac Surg*, 64: 1149-1157
- 25 Margolis M et al (2003). Percutaneous endoscopic gastrostomy before multimodality therapy in patients with esophageal cancer. *Ann Thorac Surg*, 76: 1694-1697



Questions relating to: *Nutrition support measures in oesophageal cancer*

Type your answers below, download and save or print for your records, or print and complete by hand.

Q.1 Describe the aetiology of oesophageal cancer.

A

Q.2 What risk factors influence the development of squamous cell carcinoma?

A

Q.3 Explain how the disease affects nutrition.

A

Q.4 How do the side effects of treatment impact on nutrition?

A

Q.5 Outline the recommendations for nutrition intervention in patients with oesophago-gastric cancer.

A

Q.6 What are the aims of nutrition intervention during chemotherapy?

A

Q.7 When should enteral nutrition be considered?

A

Q.8 Outline the nutrition support options in palliative care for this patient group.

A

Please type additional notes here . . .