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CASE REPORT

Case study: nutritional considerations in the head and neck cancer patient

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Head and neck squamous cell cancer (HNSCC) involves cancer of the oral cavity, oropharynx, hypopharynx and larynx. By virtue of the tumour location, nutrition support in this patient cohort can be extremely challenging. A 48-year-old male presented with a two-month history of progressive dysphagia, significant loss of weight, shortness of breath and coughing secondary to a non-benign lesion in his throat. This debilitating condition led to severe malnutrition and due to the prevailing nutritional risk the patient was assessed as a very high risk for refeeding syndrome. Several investigations were done during the admission, which then confirmed the final diagnosis of a transglottic squamous cell cancer. Surgical optimisation, including preoperative nutritional optimisation, was discussed in a multidisciplinary meeting and a total laryngectomy was scheduled seven days later. Perioperative nutritional management required careful consideration of several factors but the involvement of dietetics services from the day of admission played a crucial role in the successful management of this patient.

Keywords: head and neck squamous cell cancer (HNSCC), nutritional optimisation, nutrition support, refeeding syndrome, total laryngectomy, transglottic squamous cell cancer

Introduction

Globally, head and neck cancer (HNC) is the seventh leading cause of cancer.[1] Up to 80% of these HNC patients are malnourished on presentation due to lifestyle and risk factors associated with the disease.[2] These malignancies can involve a variety of sites and tissues in which they originate but the vast majority of these tumours arise from the mucosal squamous epithelium of the upper aero-digestive tract as head and neck squamous cell carcinoma (HNSCC). The risk factors for this cancer cohort include excessive smoking and alcohol abuse; the effect of these two substances on development of HNSCC is known to be synergistic.[3]

Therefore, nutritional support in the HNC patient group entails its own unique challenges. The inherent biology of cancer presence is not the only factor that causes a great deal of frustration in attempting to remediate nutritional deficiencies, but this heterogeneous group of patients often experiences swallowing difficulties caused by tumour site and poor oral intake secondary to painful swallowing. In most cases these tumours are diagnosed at an advanced stage when patients are already severely malnourished. Poor socioeconomic circumstances, alcohol abuse, a heavy smoking history and the lack of social support, which are common in this patient population, represent additional barriers to optimal nutrition during and after treatment for HNC.[4,5]

The impact of malnutrition is, then, thus multifactorial and, regardless of the patient's body mass index on admission, unintentional weight loss of more than 10% in the preceding six months poses a significant risk of morbidity and mortality in this subgroup of patients (Table 1).[6]

Case study

Patient T was a 48-year-old male who presented on 9 February 2021 with a non-benign lesion in his throat and progressive shortness of breath. He had a two-month history of loss of weight (approximately 20 kg), dysphagia (grade III–IV) with poor oral intake during this period, coughing and voice changes. Medical history of significance included RVD+ (retroviral disease-positive) (CD_4 = 172 cells/µl, viral load = lower than detectable limit), strong smoking history (45 packs per year) and alcohol abuse. On admission a fibreoptic nasoendoscopy was done, which found a very large fungating tumour in the right supraglottis and glottis. Furthermore, the surgical team decided to take the patient to theatre due to a possibly threatened airway for an awake tracheostomy, panendoscopy, biopsies and insertion of a nasogastric tube for the initiation of enteral feeds.

On day 3 post-admission, it was decided to trial the patient on oral feeds but he showed signs of severe aspiration and was sent for a barium swallow (oesophagram), which revealed frank aspiration at the level of the glottis. Thereafter the patient was changed back to exclusive enteral nutrition (EEN).

A definitive plan was then discussed at the multidisciplinary team (MDT) meeting, whereafter a staging CT scan was done to assist in the final decision. The CT scan revealed that the tumour was abutting the internal jugular vein, but not encasing it, which meant it was still operable. Histological findings revealed a transglottic squamous cell carcinoma. Surgical optimisation and scheduled surgery were then planned for the patient.

On day 15 post-admission, the patient was taken to theatre for his surgery where a total laryngectomy with bilateral modified radical neck dissections was performed, as well as a primary tracheo-oesophageal fistula and a pectoralis major flap were created.

Anthropometry

The patient was admitted to the hospital with weight of 41 kg, with his usual weight being approximately 60 kg, indicating

Table 1: Malnutrition-associated morbidity[6]

• Increased risk of infection	• Poor quality of life
• Delayed wound healing	• Reduced response to chemotherapy and radiotherapy
• Impaired function of cardiac and respiratory system	• Increased risk of postoperative complications
• Muscle weakness	• Increased mortality rate
• Depression	

weight loss of > 30%, and height of 1.68 m, giving him a body mass index (BMI) of 14.53 kg/m^2, classifying him as severely underweight and, together with the above presenting history, he was assessed as at very high risk of refeeding syndrome.

Biochemistry

On admission to hospital, the patient's blood chemistry values were normal except for an elevated C-reactive protein (CRP) of 42 mg/l. On day 17 post-admission (day 2 post-surgery) the albumin dropped to 27 g/l and there was also a decline in the patient's renal function and electrolyte profile (a decrease in serum calcium and phosphorus) ,which could be indicative of the stress during the perioperative period as well as the presence of significant preoperative malnutrition.[7] However, all parameters normalised on day 7 post-surgery, including an improvement in serum albumin to 32 g/l (Table 2).

Dietary management

The patient's energy requirements were initially calculated with caution for possible refeeding syndrome using the NICE guidelines[8] as well as the European Society of Clinical Nutrition and Metabolism's (ESPEN) expert group recommendations for action against cancer-related malnutrition.[9] Due to the prevailing nutritional risk factors, 5–10 kcal/kg was calculated, which equated to 205–410 kcal/day.

Preoperative

On day 2, the patient was initiated on a standard polymeric feed via nasogastric tube that provided 408 kcal/day, a high-dose thiamine (200 mg three times daily due to the patient's very high risk of refeeding syndrome) and all electrolytes were carefully monitored. The feeds were subsequently increased to goal rate by day 7 and the prescribed feeds provided 1 512 kcal and 58 g protein per day, which was within the calculated range for the patient.

The patient's weight increased by 1 kg over the ensuing seven days and clinically the patient appeared well, with the risk of refeeding syndrome, based on biochemical and clinical parameters, being significantly lower. In view of the recorded improvements, the patient's requirements were recalculated using the ESPEN guidelines recommendations for energy of 25–30 kcal/kg and a protein requirement of 1.2–2.0 g/kg. The patient was then transitioned to a combination enteral feed via the nasogastric tube providing 1 750 kcal and 88 g protein equating to 30 kcal/kg and 1.5 g/kg protein based on the patient's ideal bodyweight.

Postoperative

Enteral feeding was re-initiated within 6 hours postoperatively and increased to the preoperative goal within 24 hours. However, on day 2 postoperatively there was a decline in renal function and electrolyte parameters (Table 2). The caloric intake was decreased by 50% as a precaution, and with subsequent replacement of electrolytes slowly increased to goal rate. On Day 7 postoperatively a routine barium swallow was done again to rule out potential leaks or the formation of a pharyngocutaneous fistula (PCF). The result indicated no leak or presence of a PCF and the patient was transitioned to soft ward diet (SWD) and two oral nutritional supplements (providing 600 kcal and 40 g protein), and subsequently weaned off enteral feeding. The patient was discharged successfully on day 14 postoperatively with a weight increase of 6 kg since admission (up to 47 kg) and continued with the Nutritional Therapeutic Programme (NTP).

Table 2: Relevant biochemistry

Parameters	Normal values	Admission	Day 2	Day 9	Day 17	Day 22
Sodium	136–145 mmol/l	138	136	135	129	135
Potassium	3.5–5.1 mmol/l	4.8	3.9	4.5	4.4	4.1
Urea	2.1–7.1 mmol/l	6.1	3.2	5.9	4.9	3.5
Creatinine	64–104 µmol/l	79	61	64	51	49
Calcium	2.15–2.50 mmol/l	–	2.22	2.38	1.99	2.16
Magnesium	0.63–1.05 mmol/l	–	0.77	0.86	0.74	0.84
Phosphate	0.78–1.42 mmol/l	–	1.08	1.31	0.73	1.04
Albumin	35–52 g/l	–	34	39	27	32
TBil	5–21 µmol/l	10	–	–	–	–
ALT	10–40 U/l	11	–	–	–	–
ALP	53–128 U/l	87	–	–	–	–
CRP	< 10 mg/l	40	–	–	–	–
WCC	3.92–10.40 × 10^9/l	7.73	–	8.24	8.24	6.24
Haemoglobin	13.0–17.0 g/dl	11.2		11.6	7.3	8.6
MCV	83.1–101.6 fl	87.6		89.2	90.6	91.6
Platelets	171–388 × 10^9/l	293		378	223	400

Tbil: total bilirubin; ALT: alanine transaminase; ALP: alkaline phosphate; CRP: C-reactive protein; WCC: white cell count, MCV: mean corpuscular value.

Discussion

Nutritional intervention in the HNC patient population plays a very important role and it is part of the structural backbone to the success of the different treatment modalities and overall survival in these patients. At initial contact sessions, patients should at least have nutritional screening done using a validated screening tool and, based on the findings, an individualised nutrition plan should be prepared by a dietitian.

Regular follow-up and monitoring of patient progress and/or the need to adjust the nutrition plan should be done at least on a weekly basis during the perioperative treatment period; thus a dietitian should be involved in the patient's multidisciplinary management from the day of initial referral and/or when the patient is seen for workup by the surgical and oncological teams involved. In the preoperative phase, patients should be supported, as required, with balanced nutrition for at least 5–7 days prior to surgery. In the postoperative period, it is important to address several factors not only to prevent severe hyperglycaemia but also to provide energy of up to 30–35 kcal/kg/day and protein of 1.2–2.0 g/kg/day.[2]

The possible complication of refeeding syndrome must be considered in severely malnourished patients. Early initiation of an oral diet should be aimed for in patients in whom the swallowing function is preserved; however, the overall balance of the patient's needs should not be sacrificed simply on account of the presence of swallowing function. Ideally, oral nutrition should be started within the first 24 hours postoperatively but, in reality, this is often impossible to implement in HNC patients after surgery and reconstruction.[2]

Conclusion

In conclusion, a wealth of data exists to support the crucial role of nutrition management in the HNC patient for an improved treatment course and better overall survival rates. Thus, nutrition and dietetic services should play an integral role at any stage in the patient's care pathway. A dedicated, site-specific dietitian should be accessible, if possible, to ensure high-quality service delivery and contribution as a core member of the HNC multidisciplinary team. As part of the treatment modality, discussion and considerations, the inclusion of nutrition support should form part of the process through early identification of and intervention for high-risk patients.

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