Oral Feeding After Total Laryngectomy
Brisbane, QLD Australia

by

Jenna White

A paper submitted to the faculty of the University of North Carolina at Chapel Hill in partial fulfillment of the requirements for the degree of Master of Public Health in the Department of Nutrition

Chapel Hill
December 09, 2016

Approved by:

[Signature]

MPH Paper Advisor (signature & date)
Australia has a population of twenty four million and approximately 4,250 residents will be diagnosed with head and neck cancer each year. Males have a higher risk of developing head and neck cancer than women, with a ratio of 3:1. In addition, most head and neck cancers are diagnosed in people over the age of 40, with the highest incidence being between 75-79 years old. Head and neck cancer represents 3.5% of all newly diagnosed cancer cases and is the 8th most diagnosed cancer in Australia. Furthermore, 15%, an estimated 600 cases, are specifically laryngeal carcinoma. The annual number of deaths from head and neck cancer in Australia is approximately 1,016, which represent 2.2% of all cancer deaths, and approximately 69% of all Australians diagnosed with head and neck cancer will survive five years after diagnosis. Prognosis of disease is very individual and is dependent on cancer type and stage as well as how an individual responds to treatment. Treatment response is impacted by several factors including but not limited to overall health, nutritional status, age, medical history, and social support. As with all cancers, prognosis is best when cancer is diagnosed and treated in its earliest stages. (Australian Government, 2016; Cancer Council, 2015)

Symptoms

Laryngeal carcinoma presents with many signs and symptoms leading to diagnosis, and often are dependent on which region of the larynx contains the cancer along with tumor size. As a laryngeal tumor grows and spreads, normal larynx and surrounding tissue functionality diminishes due to the tumor obstructing laryngeal structures as well as the presence of associated inflammation. Tumors originating in the supraglottic or subglottic region do not present with many symptoms until the tumor’s size begins to obstruct the airway resulting in dyspnea; these tumors are often advanced by the time of diagnosis. Glottis tumors frequently cause dysphonia resulting in hoarseness, as the tumor interferes with the vibration of the vocal chords. Because of the voice box’s sensitivity, glottis tumors are often diagnosed in their early stages. In addition, laryngeal tumors, due to their anatomical location, have a significant impact on swallowing physiology resulting in dysphagia, odynophagia, choking, coughing, and aspiration. These patients often complain of a persistent sore throat that is unresponsive to treatment. Similar to a domino effect, these signs and symptoms often lead to weight loss, malnutrition, fatigue, and weakness upon presentation. Additionally, patients can present with blood-tinged sputum, stridor (wheezing), neck masses due to the tumor or lymph node involvement, associated neck pain, and otalgia (ear pain) caused by the tumor impacting the nerves of the throat. (Brook, 2013; Johnson, 2015; Penn Medicine, 2016)

Diagnosis

Diagnosis of laryngeal carcinoma often begins with a physical exam where an Otolaryngologist (i.e. Ears, Nose, and Throat physician) examines the neck for any lumps, bumps, or swollen lymph nodes. The physical exam is often accompanied by a laryngoscopy in which a flexible fiberoptic scope with attached camera is inserted through a patient’s mouth or nose to visibly examine the larynx and vocal cord movement. During the laryngoscopy, a biopsy is taken from the suspected area and sent to the pathologist for official diagnosis and staging. In addition, CT, MRI, and PET scans will be utilized to better understand disease location, severity, lymph node involvement and metastasis. As the cancer progresses, it gains accessibility to the lymphatic system propagating cancer spread first to the “jugular” lymph nodes located throughout the neck and then proceeds to the “supraclavicular” lymph nodes located behind the collar bone. Usually laryngeal cancer remains fairly local to the head and neck region, spreading to nearby anatomical structures and lymph nodes and less throughout the body. Nevertheless, in some cases larynx cancer can spread via the bloodstream and propagate cancer growth at distant sites; however, incidence of metastasis is generally low around 10% or less of all those diagnosed. Blood tests are often collected to evaluate blood counts and to assess liver, kidney, and overall health. Lastly, the patient is tested for HPV type 16 as not only is it a major etiological risk factor, but HPV 16+ patients tend to respond more positively to cancer treatment. (Cancer Council, 2015; Johnson, 2015; Penn Medicine, 2016)
Nutritional Implications and Literature Review

Malnutrition is a critical concern in head and neck cancer prognosis and is defined as, “An acute, subacute or chronic state of nutrition, in which a combination of varying degrees of overnutrition or undernutrition with or without inflammatory activity have led to a change in body composition and diminished function” (American Society of Parenteral and Enteral Nutrition, 2016). It is often due to insufficient dietary intake or the inability to properly digest and absorb nutrients resulting in weight loss. It is estimated that 35% – 60% of all newly diagnosed head and neck cancer patients are malnourished often exhibiting greater than 10% weight loss from their usual body weight. Many variables contribute to why a patient would present with malnutrition upon diagnosis. Foremost, the tumor itself can physically obstruct the upper digestive tract and airway causing odynophagia and dysphasia resulting in reduced energy intake. Additionally, any airway obstruction can result in dyspnea making eating uncomfortable and burdensome. Alcohol consumption in combination with tobacco are not only risk factors for head and neck cancer but also contribute to patient malnutrition. Alcohol often displaces meal consumption as well as provides empty calories as it lacks micronutrients, protein, and fat while requiring micronutrients for metabolism leading to vitamin depletion. Tobacco is a known appetite suppressant leading to anorexia and decreased consumption; therefore, the synergistic impact of alcohol and tobacco not only is the primary etiology of head and neck cancer but also contributes to patient malnutrition. Furthermore, tumor induced metabolic changes, cancer cachexia; due to increased glucose demand can further propagate malnutrition, as gluconeogenesis is upregulated resulting in fat and amino acid catabolism. Lastly, the various treatment modalities including surgery, radiotherapy and chemotherapy can cause various side effects, which further propagate malnutrition. Surgery, due to anatomy alteration, can result in chewing and swallowing dysfunction as well as radiotherapy and chemotherapy can cause mucositis, dysgeusia, xerostomia, trismus, nausea, vomiting, fatigue and anorexia all contributing to malnutrition. All cancer treatment modalities require higher energy and protein consumption that often are unable to be met exacerbating malnutrition and causing lean muscle store loss. (Alshadwi et al., 2013)

The effect of malnutrition is profound as it has a direct impact on patient outcomes. According to the Clinical Oncology Society of Australia, “Nutrition has been recognised as the second most important factor in predicting long term prognosis in head and neck cancer.” Additionally, it is estimated that “20% of cancer patients die from effects of malnutrition rather than direct effects of malignancy” (Ottery, 1994). Due to the high malnutrition rates in the head and neck population, several systematic literature reviews have been conducted to evaluate the nutritional implications in this patient population. Patients who present with malnutrition are at a greater risk for complications including: increased risk for pressure ulcers, poor wound healing, and reduced immunity increasing risk for infection. Furthermore, malnutrition contributes to fatigue, weakness, and apathy negatively impacting a patient’s recovery and reducing duration and quality of life. Because malnourished patients have reduced body weight and lean body mass, treatment dosage is often reduced, withheld, or terminated to prevent treatment toxicity. This in turn negatively impacts treatment efficacy leading to increased morbidity and mortality. Lastly, malnourished patients tend to have increased hospital durations and increased hospital readmissions contributing to overutilization of medical resources and increased healthcare expenditures. (American Society of Parenteral and Enteral Nutrition, 2016; Findlay, Bauer, & Brown, 2014; Levin, 2013; Medina & Khaffif, 2001)

Due to the severe consequences of malnutrition, it is recommended that all head and neck cancer patients be screened for malnutrition at diagnosis as well as at various intervals along the cancer treatment continuum. If a patient is identified as being of high nutritional risk, a comprehensive assessment should be conducted and if appropriate, nutrition intervention should commence prior to treatment. The COSA head and neck clinical guidelines states, “Pre-operative nutrition intervention in malnourished patients may lead to improved outcomes such as quality of life and reduce adverse related consequences of malnutrition.” Additionally, a comprehensive assessment should be completed for every head and neck cancer patient prior to the start of treatment as all treatment modalities (i.e. surgery, radiotherapy and chemotherapy) have the potential to impact nutritional status and it is important to know a patient’s baseline nutritional status for
immune system strength. The head and neck COSA guidelines, based on an extensive systematic literature review, concludes a post-surgical oncology patient’s estimated energy and protein needs are: 125-145 kJ/kg/d (30-35 kcal/kg/d) and 1.2-1.5 g/kg/d. Sousa et al is the only study found to assess a patient’s tolerance and ability to meet their hypermetabolic nutritional needs via early oral feeding post total laryngectomy; a Brazilian randomized multicenter study (n=89). Participants were divided into two groups: early oral feeding (n=44) which commenced oral feeds within 24 hours post-surgery with titrated enteral nutrition supplementation, and late oral feeding (n=45) which commenced oral feeds 7 days post-surgery and were meeting 100% of their needs via enteral nutrition. In the early group, caloric and protein needs were never obtained through oral diet alone within the first 7 postoperative days. This was mostly attributed to odynophagia and dysphagia, which often is not addressed in the literature as a potential barrier to early oral feeding. However, the study concluded that when early oral feeding was supplemented with enteral nutrition, patients were able to meet their caloric and protein needs between 3-4 days postoperatively. (Sousa et al., 2016)

II. Case Study: Feeding After Total Laryngectomy

Protocol at the Royal Brisbane and Women’s Hospital (RBWH) mandates every newly diagnosed head and neck cancer patient attends the outpatient “Combined Head and Neck Cancer” (CHNC) clinic where a multidisciplinary team consisting of ENT, Plastics, Oral Surgeons, Radiation and Medical Oncologists, and Allied Health (i.e. Speech Language Pathologists (SLP), Dietitians, Psychologists, Social Work, Occupational Therapy) consults the patient and collaboratively discusses and decides on the optimal treatment plan for each patient. The responsibility of the Dietitian at this clinic is to conduct a brief malnutrition screening and determine if the patient requires preoperative nutrition intervention as well as assesses if the patient is a candidate for a prophylactic gastrostomy tube. The case study begins at this clinic and concludes once the patient has been discharged from the hospital post total laryngectomy. Nutrition intervention does continue postoperatively through radiotherapy completion; however, it is not within the scope of this case study. Furthermore, The RBWH screens every patient for malnutrition utilizing the ‘Malnutrition Screening Tool’ (MST) which encompasses two brief questions: (a) Has the patient lost weight recently without trying and if so how much and (b) Has the patient been eating poorly due to a decreased appetite. A score of 2 or greater indicates the patient is at risk for malnutrition. If a person is identified as malnourished or identified as having future high malnutrition risk, a complete nutritional assessment is conducted. The Clinical Oncology Society of Australia has recommended the validated nutrition assessment tool PG-SGA, Patient Generated-Subjective Global Assessment, for head and neck cancer patients to help diagnose malnutrition and assess future malnutrition risk. The ‘Nutrition Care Process’ (NCP) is then implemented with a goal of attenuating the patient’s nutritional concerns. Lastly, the RBWH’s post total laryngectomy protocol consists of the patient remaining NBM for 7-10 days post-surgery in which a swallow evaluation is conducted to determine if the patient can safely progress to a pureed plus thin liquids diet. The patient is to remain unvoiced for the first two weeks post-surgery to allow for healing around the voice prosthesis. (Findlay et al., 2014)

08-26-2016: Outpatient Combined Head and Neck Cancer Clinic

Mr. Royal is a 40 year old Australian male who presents to clinic with newly diagnosed aggressive left transglottic SCC (T4, N2, M0). He has been referred to RBWH from Regional Hospital’s Emergency Department. The multidisciplinary team (MDT) concludes patient is for curative treatment including: total laryngectomy, bilateral 2-4 neck dissection with ALT flap, dental extraction, and postoperative radiotherapy.

Nutrition Assessment
• Past Medical History:
  o 08-22-2016 -- Patient presented to Regional Hospital Emergency Department with dyspnea due to airway obstruction and neck swelling caused by pharyngeal abscess. He had an eight-week history
SLP decided to put patient on thickened fluids to prevent aspiration and allow for more comfortable swallowing.

**Nutrition Diagnosis**
- Inadequate oral intake (NI-2.1) with patient at risk for malnutrition related to dysphagia and odynophagia secondary to laryngeal tumor as evidenced by intermittent skipping of meals and a weight loss of 5 kg over the past two weeks.

**Nutrition Intervention**
- *Nutrition Prescription:* High protein, high energy diet preoperatively including but not limited to dairy products including full cream milk, yogurt, cheese, custard and meat products including minced chicken, beef, lamb and all fish and shellfish.
  1. Nutrition relationship to health / disease (E-1.4): Briefly educated patient on the importance of a high protein, high energy diet preoperatively to prevent malnutrition and its associated consequences.
  2. Team meeting (RC-1.1): Collaborate with speech pathology to book an outpatient preoperative appointment with patient to discuss prophylactic nutrition to prevent further weight loss and malnutrition prior to surgery.

**Nutrition Monitoring and Evaluation**
- Monitor total energy intake (FH-1.1.1.1), total protein intake (FH-1.5.2.1), and weight (AD-1.12) at next outpatient preoperative appointment.

Mr. Royal was admitted to the RBWH for pre-op on Monday, 09-05-2016, with surgery on Tuesday, 09-06-2016. The following nutrition assessment was conducted post total laryngectomy to commence feeds and follows patient through discharge on 09-18-2016. The patient was reviewed several times by the Dietitian after the initial assessment and only pertinent follow up nutrition information is included below.

<table>
<thead>
<tr>
<th>09-07-2016 (Wednesday): Initial Inpatient Assessment Post-Total Laryngectomy</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Nutrition Assessment</strong></td>
</tr>
<tr>
<td><strong>Surgical History:</strong> 1 day post-op. Dietitian referral received by team to commence enteral nutrition support post total laryngectomy, bilateral 2-4 neck dissection with ALT flap, and dental extraction secondary to left transglottic SCC (T4, N2, M0). Patient was in theatre for 13 hours and complained of severe back pain upon waking. Three ‘Stage 1’ pressure ulcers were identified on patient’s back and scapula region. Patient communicating solely by whiteboard and dry erase marker. No additional surgical complications were noted.</td>
</tr>
<tr>
<td><strong>Social:</strong> Wife visiting often and assisting patient</td>
</tr>
<tr>
<td><strong>Anthropometrics:</strong></td>
</tr>
</tbody>
</table>
  - Weight: 67kg (147 lbs) |
  - Height: 182cm (6 feet) |
  - BMI: 20.2 kg/m² – Normal BMI |
  - IBW: 178 lbs (160 – 196 lbs) |
  - Weight History: |
    - UBW: 73kg (161 lbs) |
    - % Weight Loss: 8% within past three weeks (\(\frac{7}{52}\)) = significant weight loss |
      - Further loss of 1kg since seen at the CHNC clinic on 08-26-2016 |
    - % UBW: 92% |
- **Enteral**: Continuous NPPM @110 ml/hr over 15 hours providing 100% of protein and energy requirements (9.4 MJ [2,250 kcal], 111 g protein)

- **Nutrition Diagnosis**:  
  - Adequate enteral nutrition infusion related to patient tolerance of feeds and adherence to enteral nutrition feeding regimen as evidenced by no nutrition impact symptoms and infusion records.

- **Nutrition Intervention**:  
  - **Nutrition Prescription**: Transition to NGT bolus feeds starting tomorrow, 09-09-2016. Commence 7 Fortisip Multifibre tetrapacks / day, flushing 20mls pre and 60 mls post bolus. Provides 8.82 MJ (132 kl/kg) [2,108 kcal (31 kcal/kg)], 84 g protein (1.3 g/kg), 1610 mls total fluid.  
    1. Commence aperients

- **Nutrition Monitoring and Evaluation**  
  - Review patient Monday, 09-12-2016

09-12-2016 (Monday): Patient Review

- **Current Status**: 6 days post-op. Patient complained of one sporadic vomiting episode yesterday, 9-11, without any onset of nausea. Stated he believes it is from the feeds and questions if the tube is placed correctly. Refused some feeds yesterday due to vomiting episode. Nurse provided first dose of antiemetic 20 minutes prior to this morning’s feed; however, no effect as patient had another vomiting episode this am. Correct tube placement confirmed. Bowels open, 2x yesterday. For swallow evaluation tomorrow.

- **Dietary**: NBM, same bolus enteral regimen

- **Nutrition Diagnosis**:  
  - Less than optimal enteral nutrition (NI-2.5) related to feeds being held secondary to patient vomiting as evidenced by meeting only 75% of energy and protein needs.

- **Nutrition Intervention**:  
  - **Nutrition Prescription**: Continue current bolus enteral regimen  
    1. Work with RN to establish routine antiemetic regimen with regular antiemetics given prior to each feed.

- **Nutrition Monitoring and Evaluation**  
  - Review patient’s feed tolerance tomorrow, Tuesday, 09-13-2016

09-13-2016 (Tuesday): Patient Review

- **Current Status**: 7 days post-op. NGT stable this morning. Antiemetic regimen started, 3x /day. Pt had another vomiting episode this am, 1st in past 24 hours. Content was clear and approximately 2mls. Appears to be saliva not feed or gastric juices. Patient states no nausea or abdominal discomfort. Spoke with nurse and SLP who indicated it is normal to have a gag reflex of saliva post-surgery. Patient assured he isn’t vomiting feeds but rather a normal gag reflex secondary to surgery. Patient to receive 10am bolus feed, which he requested infuson be slow as otherwise becomes nauseated, and then expected to go NBM / NBN GT for afternoon swallow evaluation. No further nutrition impact symptoms noted. Bowels open 1x yesterday pm and 1x this am.

- **Anthropometrics**:  
  - Weight: 68 kg, up one 1 kg (2.2 lbs) in past week

- **Dietary**: NBM, Same bolus enteral regimen

- **Nutrition Diagnosis**:  
  - Less than optimal enteral nutrition (NI-2.5) related to feeds being held secondary to patient vomiting as evidenced by meeting only 58% of energy and protein needs.

- **Nutrition Intervention**:  
  - **Nutrition Prescription**: Continue current enteral regimen until swallow evaluation results
features of the case will be discussed evaluating areas of strength, areas for improvement, analysis of the literature along with general recommendations for the future.

The overall nutritional goal for an oncology patient going through treatment is to improve, maintain, or prevent a decline in the patient’s nutritional status in an effort to attenuate the consequences of malnutrition. Fundamentally, this goal was achieved as Mr. Royal was discharged from the hospital and entered postoperative and radiological care with a one kilogram weight gain, was considered nutritionally stable, and avoided all signs and symptoms of malnutrition. Many factors contributed to this outcome including the RBWH’s protocol to commence patient feeding within 24 hours of surgery to prevent lean muscle wasting. This protocol was implemented utilizing the comparative standards: EER 125-145 kJ/kg/day, EPR 1.2-1.5 g/kg/day, and EFR 30-35 mls/kg/day, which demonstrated success in the prevention of weight loss. Additionally, RBWH has firm protocol to ensure the patient is provided with continuity of care as they undergo different cancer treatment modalities. A Dietitian is part of the treatment process from the moment the patient attends the ‘Combined Head and Neck Cancer’ clinic to the time they are discharged from services, and even then a clinical handover is provided to the community Dietitian. This protocol ensures each patient is not only seen, but all relevant information is carried forth to inform the next Dietitian, reducing redundancy and ensuring each Dietitian is continuously building on prior nutritional interventions. Lastly, the RBWH places great value on the multidisciplinary team approach to care and works collaboratively to achieve optimal patient outcomes. This collaborative approach is evident when determining the best treatment modality for each patient. Physicians, Surgeons, and Allied Health Professionals together are briefed on current patient diagnosis and discuss the case with multiple different perspectives including the patient’s psychosocial implications. This collaboration allows for all healthcare providers to undertake each case with a solid and unified understanding of the patient’s background, treatment, and expected prognosis. All of these components work together to assist the patient through the cancer care continuum and provided the foundation for Mr. Royal’s positive outcome.

Every case study allows for the opportunity to reflect and identify areas for future improvement. A missed opportunity for prophylactic nutrition intervention occurred between when the patient was first assessed at the CHNC clinic to surgical inpatient admission. The patient was identified as being of malnutrition risk (MST=2) due to his recent weight loss of 5 kg (7%) over the past two weeks as well as his decreased oral intake. Although the intention was to see the patient preoperatively, this appointment did not occur and the patient was admitted with a 1 kg weight loss on admission. Retrospectively, the patient would have benefitted from prophylactic nutrition intervention. At the CHNC clinic, the patient indicated he was experiencing dysphagia and odynophagia contributing to his recent decrease in oral intake. Understanding the complexity of a total laryngectomy, it is evident Mr. Royal was going to have increased energy and protein needs and providing nutrition support prior to surgery would help mitigate the body from relying on lean muscle tissue for repair. With nutrition impact symptoms of dysphagia and odynophagia, supplements including Sustagen, Resource 2.0, and Breaka could have been utilized as these supplements provide high energy, high protein as well as are more easily swallowed due to their thickened texture. Implementing this prophylactic nutrition intervention could have mitigated any further weight loss as well as provided early education on the necessity of a high protein, high energy diet that Mr. Royal would require throughout his cancer treatment. In addition, due to the psychosocial implications of a total laryngectomy, explaining to Mr. Royal prior to surgery about his NGT and commencement of feeds would have the potential to reduce stress and anxiety. Mr. Royal would understand why the tube was inserted, what it would be used for, and what to expect in terms of how he would receive his nutrition. Preoperatively is the time to educate the patient on the importance of nutrition and its role in recovery. Additionally, because Mr. Royal was unable to communicate vocally postoperatively, deciding on a communication strategy prior to surgery would ensure the patient knows how to communicate any nutritional impact symptoms he might experience. It is always critical to keep the patient’s perspective in mind. Waking up without a voice box and having to breathe through a stoma dramatically changes one’s life, and all healthcare providers need to proactively think about ways to help the patient adjust and adapt to these life changes. Lastly, on post-op day 6, the patient expressed concerns over recent episodes of vomiting and refused several
These recommendations help to ensure the patient is receiving appropriate calories and protein to promote wound healing, prevent infection and decrease the likelihood of additional negative malnutrition consequences. Furthermore, by conducting the barium swallow evaluation 48 hours postoperatively compared to the standard protocol of 7 – 10 days, a patient can ideally commence oral feeds earlier allowing for an earlier return to “normalcy” while reducing length of hospitalization and healthcare expenditures.

In conclusion, a diagnosis of head and neck cancer warrants the need for ongoing nutrition intervention to prevent malnutrition. These cases are complex and require individualized care to optimize nutritional status. A Registered Dietitian providing nutrition support through the cancer care continuum can improve patients’ quality of life by attenuating the symptoms of disease and cancer treatment.

References


