

# Enteral Nutrition Support in Patients with Head and Neck Cancers Being Treated with Radiotherapy and/or Chemotherapy

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## ABSTRACT

**Objective:** To determine the methods, benefits and risks of enteral feeding used in the nutritional management of patients with head and neck cancer receiving treatment (Surgery, Radiotherapy and/or Chemotherapy).

**Methodology:** Databases from Google Scholar and Google, Cochrane ENT, trials, PubMed, EMBASE, KoreaMed, IndMed and ISI Web of Science.

**Results:** Malnutrition occurs frequently in head and neck cancer. Nutritional oncology is a new discipline and requires, as do other oncologic disciplines, use of standardised intervention protocols.

**Conclusion:** Early enteral nutrition support improves treatment tolerance and outcomes in head and neck cancer patients undergoing, treatment resulting in fewer complications and hospital admissions. Based on our findings, enteral nutrition support should be indicated for patients with head and neck cancer considering the potential effects to improve the quality of life.

**Keywords:** Head and neck cancer, Enteral Feeding, Nasogastric feeding, Gastrostomy, Quality of Life, Malnutrition.

## INTRODUCTION

### Malnutrition

The prevalence of malnutrition in patients with cancer is the highest of all hospital patient diagnostic groups<sup>1</sup> and it is well recognised that patients with head and neck cancer are among those at highest nutritional risk. Even before treatment commences 25–50% of patients have markedly reduced nutritional status<sup>2-4</sup>. Studies show that nearly 40-50% of head

and neck cancer patients have a markedly impaired nutritional status at the time of their initial presentation<sup>5-7</sup>. Malnutrition is associated with increased risk of infections, decreased response to treatment, poorer quality of life (QOL), increased healthcare costs and a shorter survival time<sup>8,9</sup>.

Many patients have decreased oral intake prior to treatment due to mouth or throat pain or difficulty swallowing. A

history of excessive alcohol use and smoking can also contribute to poor nutritional status. The effects of cancer therapies further complicate problems with oral intake. Treatments for head and neck cancer include surgery, radiation, chemotherapy, or CRT. Side effects of surgery include dysphagia and odynophagia; side effects of chemotherapy and radiation therapies include dysphagia, mucositis, stomatitis, nausea, anorexia, and altered taste sensation. Diarrhea can also occur with chemotherapy. Xerostomia and sometimes esophageal strictures can occur after radiation therapy<sup>10,11</sup>.

Weight loss can occur not only because of poor food intake but also due to cancer cachexia syndrome. Cancer cachexia differs from starvation in that both skeletal muscle and fat tissue are lost, and metabolism is shifted to a state of increased proteolysis and lipolysis<sup>11</sup>. Weight loss during radiation therapy to the head and neck can place at risk the safety and effectiveness of the treatment, requiring repeat CT scans in order to keep critical structures to accepted tolerance doses and emergency admissions to hospital for nutrition-related and dehydration problems are commonly reported during treatment<sup>12</sup>.

Objective of this review is to determine the methods, benefits and risks of enteral feeding used in the nutritional management of patients with head and neck cancer receiving radiotherapy or chemoradiotherapy.

## METHODOLOGY

Enteral nutrition support for patients with cancer were reviewed the titles and abstracts identified through the electronic search. Where the title and abstract did not provide adequate information, the author assessed the full study if additional information was required for further clarification. Characteristics of included

studies were randomised controlled trials with cancer cases assigned to 1 to 2 groups, interventions (PEG or NG), nutritional status, complications, durations of time enteral feeding required and home followups data. Cancer patients suffering with impaired renal function, auto immune diseases, diabetes mellitus and newly diagnosed untreated head and neck cancer related studies were excluded.

### Electronic searches

Author searched the following databases: Google Scholar and Google, Cochrane ENT, trials, PubMed, EMBASE, KoreaMed, IndMed and ISI Web of Science.

### Enteral feeding

The initiation of enteral feeding was considered when oral intake was 60% or less of the calculated requirements and/or there was a percentage body weight loss of 5% or more compared to that at the commencement of treatment. The patient's consultant clinical oncologist made the decision regarding the type of enteral feeding device prior to commencing treatment<sup>13</sup>. Patients with head and neck cancer often have distinct nutrition needs. Side effects of the disease and treatment cause the patient to develop nutritional challenges. The challenges are complex to manage, often requiring supplemental feedings. Proper calculation of protein and caloric intake is necessary to meet the increased needs. Taking treatment and activity levels into account also is necessary when calculating nutrition requirements. Fluid balance can be delicate and requires attention, too<sup>14</sup>.

### Feeding tubes

Providing adequate nutritional support for patients with head and neck cancer can be very challenging, despite the use of enteral nutrition, appetite stimulation,

and dietary counselling. This has led to the role for enteral access and tube feeding to provide nutrients (macro and micro), fluids, and medications.

Enteral nutrition support via nasogastric or gastrostomy tube may be required for patients with head and neck cancer for different reasons. For short term nutritional support NG tubes simple and cheap means of providing nutrition. When long term nutritional support is anticipated PEG other feeding gastrostomies are should be inserted. NG and PEG feeding types have both found to be effective in achieving higher protein and energy intakes and weight maintenance in head and neck cancer patients undergoing treatment (Chemo or Radiotherapy) compared to oral intake alone, indicating that the method of feeding should therefore reflect the anticipated length of feeding required<sup>15</sup>.

PEG or other gastrostomy (G) tubes are the most common feeding method for patients with head and neck cancer. Sometimes endoscopic placement cannot be done due to obstructing masses in the pharyngeal tract, in which case percutaneous fluoroscopic or surgical G tube placement can be done. Postpyloric feeding methods such as nasoduodenal (ND), nasojejunal (NJ), percutaneous jejunostomy, or PEG-jejunal tubes are used if gastric feedings are not tolerated or not possible. Nasogastric, ND, or NJ tubes are the least invasive; however, they are typically used only if needed for less than one month due to problems such as nasal and throat discomfort, the disruption of body image and daily activities, a greater likelihood of clogging due to the smaller diameter, and the risk of accidental dislodgement or removal<sup>16</sup>. Another less common method of feeding for patients with laryngeal cancer is to use a feeding tube in the tracheoesophageal puncture (TEP). TEP, a surgical opening between the trachea and

esophagus, is a method of voice rehabilitation used for patients who have had laryngectomy. A temporary feeding tube can be inserted in the esophagostomy and the end placed in the stomach<sup>17,18</sup>.

Prophylactic, or pretherapy, PEG placement is generally recommended for patients with head and neck cancer who will be receiving radiation or chemotherapy, as this can help prevent dehydration, limit weight loss, and help ensure the completion of therapies<sup>19,20</sup>.

Two important factors characterise head and neck cancer cases were immunosuppression and malnutrition. Reduced dietary intake due to dysphasia and odynophagia. Enteral nutrition support with immunomodulatory products including arginine, up regulates immune function and reduces the incidence of infectious complications. Our study stress the importance of different enteral nutrition feeding types with immunonutrient-enriched enteral nutrition for patients with head and neck cancer.

### Risk

The main issues to be considered with nasogastric feeding were aspiration risk, tube blockage or displacement, and patient comfort and acceptability. Gastrostomy tubes may be inserted using endoscopic, radiological or surgical methods and are considered to be more aesthetic in the long term than nasogastric tubes and facilitate early discharge with ease of practical management.

Complications of PEG tubes include wound infection, site leakage, skin breakdown, and erosion of the tract. Major complications such as peritonitis, necrotizing fasciitis, and fistula formation are rare. Patients should be taught to notify healthcare practitioners of any new pain, redness, or unusual drainage at tube sites. Stabilizing devices can be used to prevent

side torsion and resultant tissue breakdown, and antibiotics can be prescribed for site infection. Compression and inflammation of the tissues between the interior and exterior bolsters can lead to ulceration or, in severe cases, erosion of the tract, known as buried bumper. In some cases of severe tissue breakdown, tube removal and replacement may be necessary<sup>21,22</sup>.

### Benefits

When good symptom management is unable to achieve adequate oral intake, tube feeding is highly effective. There is consistent evidence that any form of enteral feeding results in higher protein and energy intakes and weight maintenance compared with oral intake alone<sup>29</sup>. Low level evidence, largely from retrospective studies, suggests that for high nutritional risk groups, gastrostomy insertion prior to cancer therapy provides some beneficial intermediate outcomes. Prophylactic gastrostomy insertion results in earlier commencement of nutrition support<sup>30</sup> and less weight loss compared with insertion later during treatment<sup>31,32</sup>. Patients with prophylactic gastrostomy tubes have fewer hospital admissions for dehydration or malnutrition<sup>33,34</sup> and maintain QoL during treatment compared with oral intake alone<sup>35,36</sup>.

### Nutritional requirements

Nutrition Once the decision is made regarding type of tube, there are three main methods by which the enteral supplement can be delivered: (1) the continuous drip, which can be either a 24-hour administration or cyclic, (2) intermittent delivery, which can also be performed over 24 hours without night feedings, and (3) bolus delivery, which gives flexibility in feedings to the alert and oriented patient<sup>23</sup>.

Nutrition must be supplemented with electrolytes, trace elements and vitamins<sup>24</sup>.

For EN, recommendations are based on the RDA/AI levels<sup>25</sup>. Because markers of oxidative stress are elevated and levels of antioxidants are decreased in cancer patients<sup>26</sup>, inclusion of increased doses of antioxidant vitamins might be suggested; however, there are no data to demonstrate a clinical benefit from this.

Energy and protein needs depend on the extent of surgery and other therapies, the stage of the disease, body weight, age, gender, activity level and nutritional status. In general, 25 to 30 kilocalories per kilogram body weight per day and 1 to 1.5 grams of protein per kilogram per day is appropriate for those of normal weight. For those who are hypermetabolic or need to gain weight, 30 to 35 kilocalories per kilogram or greater and 1.5 to 2.5 grams of protein per kilogram may be necessary<sup>20</sup>. We generally use a range of 20 to 35 kilocalories per kilogram in our health system, but we have found the need for weight gain in head and neck cancer patients to be as high as 39 kilocalories per kilogram<sup>27</sup>. Patients with severe malnutrition should be fed 15 to 20 kilocalories per kilogram for the first several days to prevent refeeding syndrome and then gradually advance to calorie goals. Water needs can be estimated at 30 to 40 millilitres per kilogram per day or 1 millilitre per kilocalorie, with instructions for the patient to increase water for thirst or if urine output is decreased or dark in colour<sup>20</sup>.

Enteral nutrition calories are increased in situations of undesired weight loss, lack of weight gain when needed, poor wound healing, increased activity levels, or subjective fatigue or hunger. EN feedings are decreased in situations of uncomfortable fullness, nausea, or excessive weight gain.

Bolus feeding of one to two cans of enteral nutrition formula at a time of using a syringe is a common and convenient method of feeding with minimal cost. Ideally,

tolerance to bolus feedings should be established prior to hospital discharge. Adjustments to the feeding schedule or methods may be needed. For nausea, vomiting, gastroesophageal reflux, or diarrhoea, it may be helpful to decrease the feeding bolus volume, slow the feeding rate using a gravity bag, or control the rate using a pump, and anti-nausea medications may be necessary. A post-pyloric or jejunal feeding tube and pump may be needed in cases of severe nausea and vomiting with gastric feeding. Multivitamin supplements can be added if deficiencies are suspected or if patients are using less than the volume of formula required to meet daily requirements.

#### Enteral formulas

Standard EN formulas are commonly used and well tolerated. Immediately following surgery, high-protein formulas can be used to help ensure adequate healing. For long-term home use, formulas that provide 1.5 kilocalories per millilitre are preferred for convenience. Protein powder supplements can be administered with water in the feeding tube if necessary. Patients who have higher calorie needs and are struggling with weight loss or those with uncomfortable GI fullness can use more concentrated formulas with 2 kilocalories per millilitre to get more nutrition with less volume. Fiber- containing formulas can be helpful for maintaining bowel regularity.

Studies has been conducted using arginine-enhanced formulas for post-surgical head and neck cancer patients<sup>37</sup>. The use of arginine-enriched formulas is controversial. The ADA oncology evidence-based practice guidelines state that there is not enough evidence to prove that these formulas are beneficial, and preoperative or postoperative use of arginine-enhanced formulas is not recommended for those with head and neck cancer. In a 2007 report, de Luis and colleagues concluded that an

arginine-enhanced EN formula was associated with less fistula (wound complication) rates compared with a standard formula in 72 post-surgical head and neck cancer patients, but there were no differences in wound infection rates or length of hospital stay<sup>37</sup>. More high-quality and longer term studies are needed before making recommendations about arginine-enhanced formulas.

Enriched formula improves local wound complications in postoperative head and neck cancer patients. Several studies suggest that these patients could benefit from an immunonutrient-enhanced enteral formula<sup>38</sup>.

#### Follow-up at home

It is important to remember that enteral nutrition is not without risk or complications, that as a general rule they are less severe and easier to treat than those produced by parenteral nutrition. EN can be gradually decreased as oral intake improves and as weight goals are maintained. Good communication with family members or care takers is essential so that home care can be appropriately set up and financial coverage determined. Patients should be informed at the onset what costs will and won't be covered, as insurance companies differ. For example, some companies will not pay for EN formulas in India simply because they are considered to be food, yet they will cover feeding bags or pumps if necessary.

#### Recommendations

- Improvement of communication between patients, family members and physicians. financial coverage determined.
- Preservation of quality of life.
- Support in coping with the disease.
- Management with psychosocial conflicts.

- Enteral nutrition support via NG or PEG administration at home to prevent weight loss, dehydration, nutrient deficiencies.
- Successful management of these patients requires orderly care and follow-up by a multidisciplinary nutrition team.

## CONCLUSION

Sufficient nutrient supply is one of the key factors for a successful enteral nutrition support for patients with head and neck cancer. Malnutrition and immuno suppression were two characteristics of head and neck cancer patients<sup>28</sup>. Early enteral nutrition support improves treatment tolerance and outcomes in head and neck cancer patients undergoing chemo or radiotherapy, resulting in fewer complications and hospital admissions. Patients with head and neck cancer, it is important that the management of enteral feeding should include multi-disciplinary input, in order to consider the route of feeding, and to actively encourage early swallowing rehabilitation and discontinuation of enteral feeding.

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