



Upper Gastrointestinal Surgery and Nutritional Implications

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The surgical aspects of diseases of the upper gastrointestinal (UGI) tract and the nutritional consequences of disorders that may affect these structures are presented in this summary. The complexity of resections and reconstructions of these structures and the resulting nutritional implications before and after surgery place the patient at risk for malnutrition.

The upper gastrointestinal tract consists of the oropharynx, esophagus, and the stomach. The act of swallowing or deglutition is voluntary, but the coordination of the muscles is involuntary. Surgery for malignancies involving the pharynx usually also requires lymph node removal, which is a rather extensive procedure. During recovery, and while the patient's ability to consume a normal diet is likely to be impaired, other methods of providing nutrition are needed, such as via feeding tubes placed through the nose or directly into the stomach.

The esophagus is a tubular structure that connects the pharynx to the stomach. The upper and lower sphincters serve to regulate food passage in the intended direction. Dysfunction of the lower sphincter can cause the not uncommon condition of gastro-esophageal reflux. Most cancers of the esophagus are treated by resection, ie, removal of the diseased segment involving multiple incisions. Although, minimally invasive methods are becoming more common.¹ Continuity is re-established by using the stomach or a segment of the large bowel (colon). In many cases, the entire esophagus has to be removed and the stomach or colon is reconnected or anastomosed to the pharynx in the neck. Procedures for gastroesophageal reflux are less extensive, and consist of recreating a valve at the junction of the esophagus and the upper part of the stomach.

The stomach may be affected by benign diseases or malignant conditions. Acid-peptic disease is managed quite effectively in most cases by medications that decrease acid production by the gastric mucosa. Complications of duodenal ulcers include perforation or bleeding which may require operative intervention. Malignant lesions need operative resections as the lymph nodes, too, need to be removed. Resection of part of the stomach requires reconstruction and re-establishment of continuity using the duodenum or the jejunum.² The anatomy of the stomach is also altered in procedures done for weight reduction.

Abnormalities in function of the mouth, pharynx and esophagus can thus impair the ability to swallow a regular diet. Abnormalities in cell structure are more serious, especially malignancies, causing obstruction of varying degrees. A simple matter of swallowing food that most people take for granted becomes difficult and painful. Strictures or tumors of the esophagus cause progressive decrease in food intake. Tumors of the stomach likewise cause decreased intake due to early satiety and obstruction to the outlet of the stomach leading into the duodenum.

In addition to a decreased food intake due to mechanical obstruction and pain, tumors cause an ill-understood condition of cachexia: progressive anorexia and weight loss, which can be partly explained by metabolic changes induced by the cancer cells.³ Treatment modalities such as chemotherapy and radiation therapy also cause



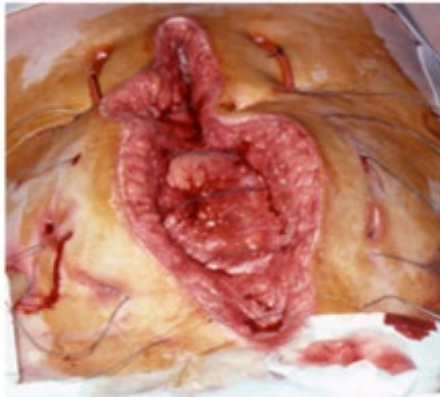
mucosal changes and ulcerations in the mouth, pharynx and esophagus further diminishing normal oral intake. The end result of advanced diseases of the upper gastrointestinal tract, whether benign or malignant, is weight loss, protein-energy malnutrition, and micronutrient deficiencies.

The nutrition care of patients with UGI tract problems begins in the preoperative period. There is clear evidence that providing balanced scientific enteral formulas as oral nutritional supplements (ONS) for 7 - 10 days prior to any major UGI tract surgery is highly cost-effective and decreases wound complications, length of stay, duration on ventilator, and anastomotic leaks.^{4,5} Preoperative nutritional supplementation is obviously not possible for emergency UGI surgical procedures. Under these circumstances, the clinician must maintain a high index of caution to establish a diagnosis of malnutrition risk based on a malnutrition screening tool.

Adjuvant therapeutic modalities are often needed for head and neck malignancies, and these include chemotherapy and radiation therapy. These often cause severe inflammation of the oropharyngeal mucosa, limiting normal intake and at times requiring termination of chemotherapy and radiation therapy. Paying close attention to the nutrition needs of the patient and providing optimal enteral feeding will often allow the physician to continue with the planned treatment.⁶

For optimal wound healing and recovery, enteral nutrition should be initiated as soon as possible after emergency surgical procedures, provided no major contraindications exist. The Enhanced Recovery After Surgery or ERAS protocols have been disseminated worldwide, although adherence to these recommendations is suboptimal. The protocols call for early resumption of oral feeding after surgery, avoiding routine nasogastric decompression, and encouraging early ambulation.⁷ The benefits of enteral nutrition on altering the stress response and immune function are important for healing and recovery.⁸ Parenteral nutrition may be necessary in specific conditions. Nutrition support should be maintained during and after treatment, irrespective of whether the treatment modalities include surgery, or non-surgical measures such as radiation therapy and chemotherapy. Enteral nutrition should be continued until the patient is able to consume an adequate regular diet by mouth. Failure to prevent or treat malnutrition in the pre- and postoperative periods can result in serious postoperative complications (Figure).

Case Study: Elective Stomach Surgery Postoperative Complication



Whose fault is this?

What went wrong?

- Advice of dietitian was ignored
- Obesity and sarcopenia not addressed
- Preop oral nutritional supplements not considered
- Enteral feeding was not started immediately postoperative
- Enteral nutrition was not advanced rapidly
- Lack of a system to address malnutrition

Figure. Elective stomach surgery postoperative complication.

Figure courtesy of Krishnan Sriram, MD,FACS,FRCSC,FCCM; Stroger Hospital of Cook County, Chicago, Illinois, USA.

Medications form an integral part of treating diseases of the esophagus or stomach, in addition to alterations in the diet. Medications often include acid-reducing agents; these can cause several nutrition-related side effects. Gastric acid enhances micronutrient availability, eg, zinc and iron from food, and deficiencies may occur after long term use of acid-reducing medications. Diarrhea due to overgrowth of *Clostridium difficile*, a “bad” bacteria in the colon, has been directly attributed to overuse of gastric acid-reducing agents.⁹ Drug-nutrient interactions must be kept in mind while caring for the nutrition needs of patients with UGI surgical problems.

Nutrition therapy of patients with UGI pathology forms an integral and crucial part of management. Preoperative nutrition assessment is important with nutrition interventions, including ONS, to attempt to decrease postoperative complications, such as leakage from anastomosis. Enteral feeding in the postoperative period is used preferentially, with parenteral nutrition reserved for the patient when gastrointestinal access is not possible, or enteral feeding is contraindicated. Adherence to evidence-based strategies for pre- and postoperative nutrition therapy is critical for enhanced recovery after UGI surgery.



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