

COMPLICATIONS OF ENTERAL NUTRITION

INTRODUCTION

Enteral tube feeding is the preferred method of nutritional support when the GI tract is functional and the patient is unable or unwilling to consume an adequate oral diet. The enteral route is efficient and cost-effective; however it is not always as easy as it looks. Gastrointestinal, mechanical, and metabolic complications can occur. It is important to thoroughly assess patients prior to initiation of tube feeding and to closely monitor them while they are receiving tube feedings in order to identify potential problems.

The complications related to enteral nutrition can be grouped into:

1. GASTROINTESTINAL COMPLICATIONS
2. MECHANICAL COMPLICATIONS
3. METABOLIC COMPLICATIONS

GASTROINTESTINAL COMPLICATIONS

➤ Nausea and vomiting

Approximately 20% of patients receiving enteral tube feedings experience nausea and vomiting. Vomiting increases the risk of aspiration. Causes are multifactorial but delayed gastric emptying is the most common problem.

If delayed gastric emptying is suspected, consider reducing narcotic medications, switching to a low-fat formula, administering the feeding solution at room temperature, reducing the rate of administration, and administering a pro-motility agent.

If the patient appears distended, check gastric residuals before the next bolus feeding, or every four hours for continuous feeding. If gastric residuals are low yet nausea persists, consider antiemetic medications.

➤ Diarrhoea

Diarrhoea is common in tube fed patients, occurring in 2% to 63% of patients depending on how it is defined. If clinically significant diarrhoea develops during enteral tube feeding, consider the following options:

- Add fiber, e.g., psyllium
- Consider an enteral formula with fiber

- Change the formula
- Use an anti-diarrhoeal agent

➤ **Constipation**

Constipation can result from inactivity, decreased bowel motility, decreased fluid intake, impaction, or lack of dietary fiber. Poor bowel motility and dehydration may lead to impaction and abdominal distension. A standard abdominal x-ray is often effective for diagnosis and will clearly differentiate constipation from bowel obstructions.

Constipation usually is improved through adequate hydration and use of fiber-containing formulas, stool softeners, or bowel stimulants.

➤ **Malabsorption/maldigestion**

Mal-absorption is defined as impaired absorption of one or more nutrients. Clinical manifestations include unexplained weight loss, steatorrhea, diarrhoea, anaemia, tetany, bone pain, bleeding, neuropath, glossitis, or oedema.

Causes of mal-absorption are many and include gluten sensitive enteropathy, Crohn's disease, diverticular disease, radiation enteritis, enteric fistulas, HIV, pancreatic insufficiency, and short bowel syndrome. Knowledge of the patient's history and selection of an appropriate enteral product should help reduce or prevent mal-absorption. However, depending upon the extent of disease, parenteral nutrition may be necessary.

MECHANICAL COMPLICATIONS

➤ **Aspiration**

Pulmonary aspiration is an extremely serious complication of enteral feeding and can be life-threatening in malnourished patients.

The incidence of clinically significant aspiration pneumonia is 1% to 4%.

Symptoms of aspiration include:

- Dyspnoea (difficult or laboured breathing)
- Tachypnea (abnormally rapid breathing.)
- Wheezing (the shrill whistle or coarse rattle heard when airway is partially blocked. It might be blocked because of an allergic reaction, a

cold, bronchitis or allergies. Wheezing is also a symptom of asthma, pneumonia, heart failure),

- Rales (Small clicking, bubbling, or rattling sounds in the lungs)
- Tachycardia (medical term for a heart rate over 100 beats a minute)
- Agitation (a state of anxiety or nervous excitement)
- Cyanosis (People whose blood is low in oxygen tend to have a bluish colour to their skin)

Aspiration of small amounts of formula may not cause immediate symptoms, but a fever later may suggest development of aspiration pneumonia.

Risk factors for aspiration include:

- Decreased level of consciousness
- Diminished gag reflex (a reflex contraction of the muscles of the posterior pharynx after stimulation of the posterior pharyngeal wall, tonsillar area, or base of the tongue)
- Neurologic injury
- Incompetent LES (Incompetence of the lower oesophageal sphincter allows reflux of gastric contents into the oesophagus, causing burning pain.)
- GI reflux (occurs when stomach acid frequently flows back into the oesophagus connecting mouth and stomach)
- Supine position (the patient is face up with their head resting on a pad positioner or pillow and their neck in a neutral position)
- Use of large-bore feeding tubes
- Large gastric residuals

Use of small-bowel feeding tubes, pro motility agents, periodic assessment of gastric residuals, and keeping the head of the bed elevated may reduce the risk of aspiration.

➤ **Tube malposition**

Complications may arise during the placement of a feeding tube or simply from the presence of one. Feeding tube placement can cause bleeding, tracheal or parenchymal perforation, and GI tract perforation. Placement of tubes by trained personnel and using appropriate post-placement monitoring should minimize these complications.

Presence of the feeding tube itself may cause upper and lower airway complications, aggravation of oesophageal varices (enlarged veins found in the oesophagus), cellulitis (inflammation of subcutaneous connective tissue.), necrotizing fasciitis (a rare bacterial infection that spreads quickly in the body and can cause death), fistulas (an abnormal connection between two body parts, such as an organ or blood vessel and another structure), and wound infection. Use of a small-bore feeding tube and very attentive nursing care can minimize many of these problems.

➤ **Tube clogging**

Tube clogging is more likely with intact protein products and viscous products. Most clogs can be prevented by routine flushing of the feeding tube, use of warm water using slight pressure, use of clean technique to minimize formula contamination, and extreme care when administering medications via the feeding tube.

The recommended first line method to unclog a tube is to instil warm water using slight manual pressure. If this fails, a pancre-lipase and sodium bicarbonate solution may be instilled in order to "digest" the clog.

METABOLIC COMPLICATIONS

Incidence and severity of metabolic complications may be less. Careful monitoring can minimize or prevent metabolic complications.

PROBLEM	CAUSE	TREATMENT
Hyponatremia	Over hydration	Change formula Restrict fluids
Hypernatremia	Inadequate fluid intake	Increase free water
Dehydration	Diarrhoea Inadequate fluid intake	Evaluate causes of diarrhoea Increase free water
Hyperglycemia	Too many calories Lack of adequate insulin	Evaluate caloric intake Adjust insulin
Hypokalemia	Re-feeding syndrome Diarrhoea	Replace K Evaluate causes of diarrhoea
Hyperkalemia	Excess K intake Renal insufficiency	Change formula

➤ **Re-feeding syndrome**

Re-feeding of severely malnourished patients may result in "re-feeding syndrome" in which there are acute decreases in circulating levels of potassium, magnesium, and phosphate. The sequela (a condition which is the consequence of a previous disease or injury) of re-feeding syndrome adversely affect nearly every organ system and include cardiac dysrhythmias, heart failure, acute respiratory failure, coma, paralysis, nephropathy, and liver dysfunction.

The primary cause of the metabolic response to re-feeding is the shift from stored body fat to carbohydrate as the primary fuel source. Serum insulin levels rise, causing intracellular movement of electrolytes for use in metabolism.

The best advice when initiating nutritional support is to "start low and go slow". Recommendations to reduce the risk of re-feeding syndrome include:

- 1) Recognize patients at risk like-
 - Anorexia nervosa
 - Kwashiorkor or marasmus
 - Chronic malnutrition
 - Chronic alcoholism
 - Prolonged fasting
 - Prolonged IV hydration
 - Significant stress and depletion
- 2) Correct electrolyte abnormalities before starting nutritional support
 - Administer volume and energy slowly
 - Monitor pulse, I/O (Input/Output), electrolytes closely
 - Provide appropriate vitamin supplementation
 - Avoid overfeeding