

Enteral Nutrition & Total Parenteral Nutrition

All infusion therapies have been covered except for two: **Enteral Nutrition Therapy** and **Total Parenteral Nutrition Therapy**. These are the two most difficult therapies to learn, both from a clinical perspective and from a collections perspective.

ENTERAL NUTRITION THERAPY

Healthy individuals consume a solid food diet and receive nutrition by mouth through swallowing and then digesting food. However, individuals that are unable to obtain nutrition by swallowing can receive Enteral Nutrition or **Tube Feeding**. Enteral Nutrition/Tube Feeding is the medical treatment of giving nutrition by passing a liquid diet through a tube into the stomach or intestines. During some illnesses, the body may require increased nutrients to meet its demands for physical repair and to restore itself to health. Depending on the circumstance, a person may even receive tube feedings and be able to eat at the same time. The tube feeding must be in liquid form for individuals to obtain the same nutrients that are found in solid foods.

Liquid nutrition is available in two forms:

- A Ready –To – Use Liquid Formula
- A Powder That Must Be Mixed With Water

A few examples of Enteral Formula are:

- Ensure
- Isosource
- Jevity 1 cal and Jevity 1.2
- Osmolite 1.0, 1.2 and 1.5
- Promote
- Glucerna
- Peptamen
- Nepro

Some patients, particularly the elderly, drink enteral formulas in order to obtain the necessary nutrients needed to gain weight, maintain present weight or prevent further weight loss. In this example, the enteral formula is used as a **dietary supplement**. Although some enteral formulas can be readily found in the local grocery store, most of the more specialized enteral formulas can only be obtained through a prescription from a physician. Enteral formulas are assigned an **NDC number (National Drug Code)** just like a drug, and have an assigned AWP price, just like a drug.

Other patients who cannot swallow food normally receive an enteral formula as the sole (only) source of nutrition. In these cases, there is a malfunction or disease that necessitates bypassing the swallowing of food. Typically, these patients are fed by a tube placed directly into the stomach or intestines.

The following are the most common **diagnoses for Enteral nutrition:**

1. Dysphagia – Difficulty in Swallowing
2. Cancer of Head or Neck (usually cancer of mouth or throat)
3. Esophageal Obstruction – Obstruction in Esophagus

Common ICD-9 codes for the above mentioned diagnoses are:

- 787.20-787.24 and 787.29 – Dysphagia
- 195.0 – Cancer of the Head or Neck
- 530.0 – Esophageal Obstruction- Obstruction in Esophagus

There are many other indicators for enteral nutrition. Patients who have a central nervous system disease may require enteral nutrition during the late stages of the disease. Patients who are in a vegetative state and are continuously on a ventilator will normally require tube feeding to sustain life.

The type of feeding tube that an enteral patient has can be compared to the kind of IV line an infusion patient has.

There are four main feeding tubes:

1. G Tube (Gastrostomy Tube)
2. NG Tube (Naso-Gastrostomy Tube)
3. J Tube (Jejunostomy Tube)
4. Mic-Key (Gastrostomy Tube)

Some feeding tubes are placed through the nose and some are placed through the abdomen. There are **three methods of administration for Enteral Therapy:**

1. Gravity
2. Pump
3. Syringe (Bolus)

Formulas are placed in a bag and hung on an IV pole when utilizing the gravity method. Pump feedings are also placed in a bag and infused over a scheduled length of time to regulate the flow of nutrition. The feedings may also be given via a very large syringe, which is inserted into the tube placed in the

abdomen. This is also known as the bolus method. The most important point to remember regarding enteral therapy as the sole source of nutrition is its necessity to sustain life.

A few examples of Enteral Pumps are:

- CADD Prizm Pump
- Infinity Pump
- Patrol Pump

All pumps that are used have a determined pump rate that is set on them for the enteral formula to be administered, i.e. 65 ml/hr.

TOTAL PARENTERAL NUTRITION (TPN)

Total Parenteral Nutrition, **hyperalimentation**, is usually called TPN for short. TPN is probably the single most expensive infusion therapy. It supplies all of the body's daily nutritional needs (hence the term total).

Certain disease states or conditions require nutrition in order to prevent malnutrition. Parenteral support is only considered when oral or enteral (tube feeding) supplementation is impossible, or when the absorptive or functional capacity of the gastrointestinal tract is inadequate to meet the nutritional needs of the patient.

In general, parenteral nutrition is required for patients who cannot absorb nutrients through the normal digestive process. Patients who have had a massive bowel resection, commonly called **Short Bowel or Short Gut Syndrome**; do not have enough intestines to allow for normal absorption of nutrients. Diseases of the small intestine, radiation enteritis (inflammation of the intestine due to radiation therapy for cancer treatment), and moderate to severe pancreatitis with severe diarrhea and Hyperemesis (uncontrolled vomiting) can all require the application of TPN therapy.

TPN is usually administered through a catheter placed into a large vein, such as a central line catheter (also known as a Hickman or Groshong). There is usually a sufficient volume and flow rate of blood in a large vein within the chest area close to the heart to dilute the highly concentrated nutrient. The venous route used for nearly all TPN infusion is the **superior vena cava** – a large blood vessel that delivers all of the venous blood from the upper half of the body into the right atrium of the heart.

Besides the sterile nutrient solution (TPN solution) and infusion supplies, the **following are necessary for TPN infusion therapy**:

- A central venous access device (central catheter)
- Ambulatory or stationary pump to accurately control the infusion rate

- A portable IV pole on which to mount the pump, if a stationary pump is used instead of an ambulatory pump

The TPN solution comes in 1-4 liter bags. The solution may be given continuously (around the clock), or for only a specific number of hours either at night while the patient sleeps, or during the day. This is called “cycling.”

It is preferable to teach the patient about TPN before being discharged from the hospital. Once home, it is necessary for all TPN patients to be closely monitored by both a nurse and a pharmacist. TPN patients will always require clinical follow-up by a physician, a nurse and a pharmacist. Routine physical assessments and blood draws for laboratory evaluations will be ongoing to ensure that the therapy is having the desired effect, and that side effects are being kept to a minimum. Some of the **side effects are:**

- Metabolic Problems – Too much or not enough sugar in the bloodstream, or too much or not enough fluid being given
- Fever and/or Chills
- Difficulty Breathing

Common Diagnoses for TPN Therapy

- Cancer (neoplasm or cancerous growth)
- Malabsorption
- Gastrointestinal Obstruction
- Wasting Syndrome (AIDS)
- Hyperemesis Gravid arum
- Short Bowel (gut) Syndrome
- Chron’s Disease

The average length of TPN therapy is 3-6 months. Most TPN is administered on a short-term basis, but some patients must be on TPN for several years, or even the duration of their lives. When needed, this therapy is administered daily. Most insurance companies will reimburse TPN costs for diagnoses that are associated with mal-absorption (short bowel), and malnutrition. Billing and collections for TPN therapy will be discussed in subsequent lessons.

In the majority of cases, **lipids** are given as an additive to the TPN solution. Lipids are the fats needed to complete one’s diet. Lipids are part of what is needed to help maintain present weight. Without lipids, a patient could still continue to lose weight while receiving TPN.

Lipids come in four normal dosage solutions. There are 10% and 20% volume lipids:

- 10% 250ml
- 10% 500ml

- 20% 250ml
- 20% 500ml

REVIEW OF CONCEPTS

- **Enteral Nutrition Therapy** – Providing nutrition by passing a liquid diet through a tube into the stomach or intestines. Also called tube feeding.
- **Total Parenteral Nutrition Therapy (TPN)** – Supplies all of the body’s daily nutritional needs through a catheter placed into a large vein. Also called Hyperalimentation.
- **Tube Feeding** – Another name for Enteral Nutrition Therapy.
- **Two Forms of Liquid Nutrition:**
 - A Ready-to-Use Liquid Formula
 - A Powder that must be mixed with Water
- **Dietary Supplement** – Provides nutrients that are missing or are not consumed in sufficient quantity in a patient’s diet.
- **National Drug Classification (NDC)** – A product identifier for human drugs.
- **3 Common Enteral Therapy Diagnoses:**
 - Dysphagia – Difficulty in swallowing
 - Cancer of Head or Neck (Usually cancer of mouth or throat)
 - Esophageal Obstruction
- **4 Main Feeding Tubes:**
 - G Tube (Gastrostomy Tube)
 - NG Tube (Naso-Gastrostomy Tube)
 - J Tube (Jejunostomy Tube)
 - Mic-Key (Gastrostomy Tube)
- **3 Enteral Therapy Methods of Administration**
 - Gravity
 - Pump
 - Syringe (Bolus)
- **Hyperalimentation** – Another name for Total Parenteral Nutrition (TPN).
- **Short Bowel/Short Gut Syndrome** – A condition brought on by a massive bowel resection after which the patient does not have enough intestines to allow for normal absorption of nutrients.
- **Superior Vena Cava** – A large blood vessel that delivers all of the venous blood from the upper half of the body into the right atrium of the heart. This large vein is utilized for nearly all Total Parenteral Nutrition (TPN) infusion.
- **3 Necessary TPN Infusion Supplies:**
 - A Central Venous Access Device (Central Catheter)
 - Ambulatory or Stationary Pump
 - A Portable IV Pole for a Stationary Pump
- **Side Effects of TPN Therapy:**
 - Metabolic Problems – too much or not enough sugar in the bloodstream or too much or not enough fluid being given.
 - Fever and/or Chills

- Difficulty Breathing
- **Common Diagnosis for TPN Therapy:**
 - Cancer (Neoplasm or Cancerous Growth)
 - Malabsorption
 - Gastrointestinal Obstruction
 - Wasting Syndrome (AIDS)
 - Hyperemesis Gravidarum
 - Short Bowel (Gut) Syndrome
 - Chron's Disease
- **Lipids** – The fats needed to complete one's diet; they help one maintain present weight.

QUESTIONS

1. Enteral Nutrition Therapy is also referred to as:
 - a. Intravenous Therapy
 - b. Total Parenteral Nutrition
 - c. Tube Feeding**
 - d. Subcutaneous Injection Therapy
2. A physician has ordered 1500 calories per day of Promote formula. 250 ml = 250 cal/per can and a 30 day shipment is needed. How many cans will the patient need to receive 1500 calories per day?
 - a. 180 Cans**
 - b. 250 Cans
 - c. 460 Cans
 - d. 1200 Cans
3. Which diagnosis would require treatment with Enteral Therapy?
 - a. A Patient in a Vegetative State**
 - b. Short Bowel Syndrome
 - c. AIDS
 - d. All of the Above
4. The methods of administration used to provide Enteral Therapy is:
 - I. Bolus
 - II. Intravenous
 - III. Pump
 - IV. Gravity
 - V. Injection
 - a. I, III
 - b. I, III, IV**
 - c. II, V
 - d. III Only
5. Hyperalimentation is also known by what other name?
 - a. Hormone Therapy
 - b. Hydration Therapy
 - c. TPN**
 - d. Chemotherapy
6. What type of catheter is required to administer TPN?
 - a. Peripheral Catheter
 - b. Foley Catheter
 - c. Central Line Catheter**
 - d. Midline Catheter
7. Which diagnosis identified below is NOT typically considered common for TPN?
 - a. Hyperemesis Gravidarum
 - b. Short Bowel Syndrome
 - c. Dysphagia**
 - d. Wasting Syndrome