

## Clinical Module 8 – Nutrition Support

### Module 8 questions:

#### I. Abbreviations/Definitions

**Shock** – Condition that occurs when there is a lack of blood flow in the body. Lack of blood flow means that the cells and organ are not getting enough oxygen and nutrients which means they cannot function properly. The more oxygen deprived cells and organs are, the more damaged they become. This condition is life-threatening and can lead to death.

**Refeeding Syndrome** – Sudden shift in electrolytes that happens when individuals who are malnourished or starved start eating again.

**ARDS** – stands for Acute Respiratory Distress Syndrome. ARDS happens when there is fluid buildup in the alveoli (air sacs) in the lungs.

**Pancreatitis** – inflammation of the pancreas which can be caused by a number of different conditions like alcoholism, gallstones, abdominal surgery, certain medications, smoking, Cystic Fibrosis, hypercalcemia, hypertriglyceridemia, infection, abdominal injury, or pancreatic cancer.

**Respiratory Quotient** – ratio of carbon dioxide production to oxygen consumption.

**Ileus** – buildup or blockage (caused by food) in the intestine

**Pulmonary Edema** – excess fluid in the lungs

**Sepsis** – body's response to infection. It happens when someone already has developed an infection which causes the immune system to release chemicals in the body to fight the infection. However, in sepsis, those chemicals cause inflammation throughout the body. This inflammation then causes blood clots and leaky blood vessels which causes poor blood flow. Poor blood flow means that organs do not get enough oxygen. In severe cases, sepsis can lead to death.

#### II. Pathophysiology

A. Describe the physiologic and biochemical changes which occur during the post-operative period for a patient having major surgery. How might this impact plans for nutrition support?

For patients who have undergone surgery there is an increased risk for malnutrition and underfeeding therefore, it is important to start nutrition support early especially for those who are at nutritional risk or who have undergone gastrointestinal surgery. For these individuals, increased protein, Omega-3's, Vitamin A, C, D, and calcium should be increased in order to speed up the healing process.

B. Describe the physiologic and biochemical changes which occur during sepsis/septic shock. How might this impact plans for nutrition support?

When sepsis happens, there are several things that happen in the body. Someone experiencing sepsis experiences a sharp drop in blood pressure. Other things that happen in sepsis include body temperature reaching below 96.8 °F or above 101 °F, heart rate higher than 90 bpm, respiratory rate higher than 20 breaths/minute. Signs of severe sepsis include decreased urine output, decreased platelet count, difficulty breathing, abnormal heart pumping,

and abdominal pain. Although providing nutrition support for septic patients is extremely important, there is a tendency to overfeed these patients because of all the trauma their body is going through.

C. What effect can malnutrition have on respiratory function? How might this impact plans for nutrition support?

When an individual is malnourished, respiratory functions such as respiratory muscle performance, lung structure, defense mechanisms, and control of ventilation. If someone is malnourished, they would need more energy (in the form of food) in order for the respiratory system to function. Increased energy needs should be taken into account by the RD.

### **III. Nutritional Management**

A. Describe the different routes for administration of enteral feedings (PEG, NG, and PEJ). Include indications for each route of administration in your description.

<b>Enteral Feeding Route</b>	<b>Indication</b>	<b>Other Comments</b>
PEG	For patients with swallowing difficulties, appetite problems, or any other issues in which food intake through the mouth is not possible.	Percutaneous endoscopic gastrostomy (PEG) – this procedure requires a feeding tube to be placed through the abdominal wall into the stomach. This feeding tube bypasses the mouth and esophagus, so all the food, fluids, and medications go directly to the stomach.
NG	<p>Diagnostic indications:</p> <ul style="list-style-type: none"> <li>- Upper GI bleeding evaluation</li> <li>- Aspiration of gastric content</li> <li>- Identification of the esophagus and stomach on a chest radiogram</li> <li>- Administration of radiographic contrast to the GI tract</li> </ul> <p>Therapeutic indications:</p> <ul style="list-style-type: none"> <li>- Gastric decompression</li> <li>- Bowel rest when someone has a small bowel obstruction</li> <li>- Aspiration of gastric content from ingestion of toxic material</li> <li>- Medication administration</li> <li>- Feeding</li> <li>- Bowel Irrigation</li> </ul>	<p>Short-term</p> <p>This tube is placed through the nasal passage to the stomach.</p>
PEJ	<p>For people who cannot tolerate feeds to the stomach.</p> <p>For people who have trouble swallowing or who are at risk for food going into the lungs.</p>	<p>The tubes inserted through a small cut in the abdomen into the small intestines, in the section called the jejunum.</p> <p>The tubes are much smaller, so these tubes are easily clogged.</p>

		Ensure that liquids are thin enough.
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B. Review the enteral feeding formulary for your institution and discuss appropriate enteral feeding formula use for each route. (You may want to do this in chart form.)

Springfield Dialysis uses mostly Nepro as its enteral feeding formula. It is renal-friendly since it is low in potassium and low in phosphorus. It is given to patients who need to increase their protein intake. For patients who really have no appetite and not consuming anything by mouth, Ensure is recommended but this is only in rare cases.

C. Discuss re-feeding syndrome. Include in your discussion, the role of phosphorus in respiratory function. What are some possible consequences of over feeding a patient who requires mechanical ventilation?

After an individual goes through malnourishment or starvation, food needs to be re-introduced to their body. During this re-introduction of food, a condition called re-feeding syndrome can happen. This condition occurs because of extreme shifts in fluid and electrolyte levels when the patient is fed enterally or parenterally. Signs of re-feeding syndrome include hypophosphatemia (hallmark sign), abnormal sodium and fluid balance, changes in glucose, protein, and fat metabolism, thiamine deficiency, hypokalemia, and hypomagnesaemia.

Since the hallmark symptom of re-feeding syndrome is hypophosphatemia (depletion of phosphorus), monitoring phosphorus levels is extremely important. Phosphorus is important for a variety of intracellular processes and important for the structure of cell membranes. Phosphorus is also important to deliver oxygen to the tissues.

During re-feeding syndrome, increases in heart rate, blood pressure, oxygen consumption, cardiac output, and expansion of plasma volume may occur. Re-feeding syndrome affects respiratory function since it's workload is increased because the patient is eating again. This is because the respiratory muscle had already reduced in mass as well as a reduced ATP content. This can result in a person becoming short of breath and is unable to sustain using too much oxygen instead of carbon dioxide during the respiratory cycle.

For mechanically ventilated patients over feeding can cause serious consequences such as azotemia, hypertonic dehydration, and metabolic acidosis. Hyperglycemia, hypertriglyceridemia, and hepatic steatosis may occur when excessive carbohydrate feedings are given. High-fat infusions have caused hypertriglyceridemia and fat-overload syndrome. Hypercapnia and refeeding syndrome are also caused by overfeeding.

D. What is propofol (Diprivan)? How might use of this drug impact recommendations for nutrition support?

Propofol is a drug used to help individuals going on anesthesia to relax. It is also used as a sedative for patients on a breathing machine. The medication is a lipid containing solution that contains 1.1 kcals/mL. Individuals who are prescribed propofol should be prescribed low-fat enteral feedings or fat-free TPN's.

E. What is the rationale for using MCT oil in the diets of patients with malabsorption syndrome?

Medium chain triglyceride oil is recommended for patients with malabsorption syndrome because its structure allows it to be easily absorbed into the bloodstream from the GI tract since it binds to albumin. MCT's do not require bile or pancreatic enzymes.

#### **IV. Nutrition Support Practice Calculations**

Using the enteral feeding formulary at your clinical placement, complete the following care plans:

1. Pt A. is an 80-year-old F admitted to the ICU with CHF. Ht: 5'5" Wt: 50 kg She required intubation secondary to pulmonary edema. A naso-jejunal feeding tube has been placed. You are consulted to suggest an appropriate feeding.

$$\text{BMI} = 703 \times 110 \text{ lbs} / 65 \text{ in}^2 = 18.3$$

Calorie needs: 20 - 25 kcal/kg  
1000 - 1250 calories

Protein needs: 0.8 – 1.0 g/kg  
40 g – 50 g

Fluid needs: 1 mL/kcal  
1000 – 1250 mls

Feeding prescription:

Recommend Jevity 1.0 cal at a continuous rate of 50 mL/hr with 100 mL water flushes every 4 hours. 1 L of Jevity 1.0 provides 44.3 g of protein, 835 g/mL of water, and 1060 calories.

2. Pt B. is a 74-year old M s/p CVA 7 days ago. Ht: 68" Wt: 160 pounds (73 kg) He is NPO x 1 week. A PEG was placed yesterday. You are consulted to suggest an appropriate feeding.

$$\text{BMI: } 703 \times 160 \text{ lbs} / 68 \text{ in}^2 = 24.3$$

Calorie needs: 25 – 30 kcal/kg  
1825 – 2190 calories

Protein needs: 1.0 – 1.25 g/kg  
73 g – 91 g

Fluid needs: 30 mL/kg  
2190 mls

Feeding prescription:

Recommend Jevity 1.5 cal at a continuous rate of 50 mL/hr with 250 mL water flushes every 4 hours. This feeding contains 1800 kcals and 77 g of protein.