Nutrition

Assumption

The student knows the metabolism, function, and the most common signs of deficiency for proteins, calories, vitamins, and trace elements.

Goals

The student will develop the knowledge necessary to:

1. Describe the metabolism, function, and signs of deficiency for protein, calories, vitamins, and trace elements.
2. Perform a comprehensive nutrition assessment, describe indications, and prescribe enteral or parenteral nutrition (PN).
3. Monitor the effectiveness/complications of a nutrition plan for outpatients and hospitalized inpatients.
4. Provide initial treatment of short bowel syndrome and develop a plan for intestinal rehabilitation.

Objectives

By the end of the core surgical clerkship, the student will be able to:

1. List the signs of malnutrition from proteins, calories, vitamins, minerals, and trace elements.
2. Perform appropriate nutritional assessment using history and physical examination, and anthropometric, laboratory, and dietary data.
3. Understand the importance of nutrition in preventing surgical complications, and how and when to adequately prepare patients nutritionally for surgery.
4. Describe various methods of access for enteral nutrition (EN) and parenteral nutrition (PN).
5. Describe indications for initiating EN or PN.
6. Describe the differences between the main categories of enteral formulations: polymeric, elemental and semi-elemental, blenderized, disease-specific, and modular.
7. Select an appropriate enteral formula for a patient, based on patient characteristics and disease state.
8. Provide an initial PN prescription (volume, carbohydrates, protein, lipids).
9. Describe the most common complications of PN in the short-term and long-term (refeeding syndrome, line infections, Korsakoff's psychosis, etc.).
10. Describe the causes, symptoms, complications, and medical/surgical treatment of short bowel syndrome.

Problems

For each of the following problems, answer the following questions:

- What further data should be obtained from the patient's history?
- What physical exam findings would you look for?
- What is your differential diagnosis?
- What work-up would you recommend?
- What therapy or treatment would you recommend?

1. A 40-year-old polytrauma patient has been hospitalized in the Trauma ICU for 36 days after being struck by a passenger vehicle. He was reported to be homeless with an unclear medical history other than multiple prior ER visits for acute alcohol intoxication. He remains mechanically ventilated and has intermittently been fed enterally but required total parental nutritional (TPN) support for the majority of his hospitalization and is currently recovering from a period of septic shock secondary to his ventilator-associated pneumonia.

   After a brief period of time, the above patient begins to show signs of recovery. His clinical condition improves and he is able to be transitioned to a step down unit. During this period of recovery, his tube feeds are increased and he is transitioned off TPN. After several days of tolerating full dose tube feeds, he begins to develop multiple cardiac arrhythmias and increased work of breathing, and his daily laboratory studies show a precipitous decrease in his potassium, phosphorus, and magnesium levels.

2. You have been asked to evaluate a patient on the surgical oncology service who recently underwent a pancreaticoduodenectomy (Whipple procedure) for an obstructing pancreatic mass. Prior to the procedure, the patient reported an unintentional 30 pound weight loss during the proceeding 3 months despite receiving nutritional support.

3. While rounding in the Trauma Intensive Care Unit, you are asked to decide on the nutritional support method for: A healthy 35-year-old admitted for an isolated traumatic brain injury after falling while at work. He is currently intubated and hemodynamically stable.

4. A 30-year-old female with Crohn's Disease s/p multiple bowel resections and an end jejunostomy. She is eating a regular diet (3 meals per day) and reports very high jejunostomy output (4.5 L/day), resulting in dehydration and acute kidney injury.

Skills

Demonstrate the ability to place a:

1. Nasogastric Tube (*see ACS/ASE Medical Student Simulation-based Surgical Skills Curriculum, Year 2, Module 5*)
2. Central Venous Catheter (*see ACS/ASE Medical Student Simulation-based Surgical Skills Curriculum, Year 3, Module 4*)

Teaching Hints

Review a case with students involving the use of early feeding after surgery and evaluate the effectiveness of feeding.

Prevention

Pre-operative optimization
Nutritional maintenance and surveillance
Oral Nutritional Supplements (ONS)

Special Considerations

Alcohol withdrawal
Cancer cachexia
Anorexia of aging
Short Bowel Syndrome