**FULL NAME:**

**DATE:**

**NUTR 703. Spring 2025. Case 4. TPN**

**Instruction:**

Review the case in Section I and complete the following sections.

All assignments should be in Times New Roman and 12-point font; black.

1. **Nutrition Assessment:** Complete the ADIME sheet. Fill in all information highlighted in yellow and include calculation steps at the end.
2. **Disease States:** Write about the following conditions, covering 1) pathophysiology (definition, causes/mechanism of disease, and clinical manifestations), 2) statistics (prevalence, which year the data is based on, gender/age differences if applicable), and 3) Medical Nutrition Therapy (MNT) or key nutritional considerations. Include references and use proper citation in AMA or APA format:
   1. Afib
   2. Lap band surgery
   3. Transient Ischemic Attack
3. **Medications:** Complete the table with all pertinent medications.
4. **Labs:** Complete the table with all pertinent lab values
5. **References**: Ensure all references are formatted consistently in AMA or APA style.

# I. Nutrition Assessment

**INITIAL NUTRITION ASSESSMENT**

Consult for TPN Recommendations.

**Assessment:**

"70 yo F with PMH of Afib, s/p lap band, TIA, HTN, LVEF (60%), severe MR, underwent MVR/TVR, LAA clip MAZE on 12/22. Course c/b removal of clot, washout of chest on 12/23, shock and AKI.

**Nutrition Interval:**

- Remains orally intubated, sedated and paralyzed.

- Remains on ECMO.

- CVVH continues (initiated on 12/24 -connected to RVAD system).

- Nutrition Support: Nepro @10 ml/hr x 24 hrs via OGT (\*calculate how much this provides: total **240** ml, **432** kcals, **19** g protein, **38** g carb, **175** ml free water / day)

*Nepro/1L: 1.8 kcal/ mL, 81g/1L kcal Pro, 160 kcal/1L CHO, 727 ml free water/1L*

10ml/hr x 24hrs = **240 mL,**

1.8 x 240 = **432 kcal,**

0.081 x 240 = **19.44 g Pro,**

0.16 x 240 = **38g CHO,**

0.727 x 240 = 174.48 **mL free water**

- Team paged for **PN recommendations** due to patient with poor absorption due to distended abdomen.

- No Known Allergies

**Pertinent Meds:**

Flagyl, magnesium sulfate/D5W (1 g) x 1 dose, pantoprazole, phosphorus (500 mg) x 1 dose, senna, nimbex, fentanyl, epinephrine, vasopressin @4 units/hr, levophed @5 mcg/min, propofol (current rate of 18.2 mL/hr provides **480** Kcal/day)

* 1. kcal/ml

18.2 x 24 hrs = 436.8 ml x 1.1= 480.48 kcal/day

**Physical Assessment:**

Skin: No pressure injury

Edema: Anasarca

**Anthropometric Measurements**

Ht: 152.4 cm (5')

Wt. Hx: (Admit; 12/20) 152 lb/68.9 kg 🡪 (12/21) 175 lb/79.8 kg -Bed. (12/30) 171 lb/78 kg

IBW: 100 lbs/45 kg +/-10%

IBW%: 173 %

BMI: 33.4

*(Use the most recent weight for calculation. Round the IBW to whole number)*

**Pertinent Labs:**

|  |  |
| --- | --- |
| GLUCOSE | 197 |
| NA | 135 |
| K | 4.3 |
| CHLOR | 105 |
| CO2 | 17.0 |
| BUN | 21 |
| CA | 7.7 |
| CREAT | 0.74 |

|  |  |
| --- | --- |
| CA | 7.7 |
| MAGNESIUM | 2.8 |
| PHOSP | 2.1 |

|  |  |
| --- | --- |
| Result Component | Current Result |
| TRIG | 684 |
| CHOL, HDL | <5 |
| LDL | Unable to calculate |
| AST | 360 |
| ALT | 12 |
| CHOL/HDL RATIO | Unable to calculate |
| CHOL, TOT | 102 |

**Estimated Nutrient Needs:**

Energy: 1125 - 1350 kcals/day (25-30kcals/45 kg of IBW )

Protein: 81 – 104 g/day (1.5-2.3g/45 kg of IBW )

Fluid:  per MD

*(Round to whole number for kcals, grams)*

**Nutrition Diagnosis** *(at least one PES)*

**Inadequate oral intake related to intubation and receiving tropic feeds while hemodynamically unstable on pressor support, sedated and paralyzed as evidenced by unable to meet goal nutritional requirements via EN at this time.**

Increased nutrient demands related to physiological demands as evidenced by significant clinical course (MVR/TVR, LAA clip MAZE, removal of clot, shock and AKI).

**Nutrition Intervention:**

- Recommend **change TF to Vital HP** @ 10 mL/hr x 24 hours, provides **240 Kcal, 21g PRO /day**

- Recommend **Non-Standard TPN x 48 hrs.**

AA 15% 540ml (= **81** g protein, **324** Kcal)

81/0.15 = 540ml

81x4 =324 kcals

              D 70% 143 ml (= **100g** carb, **340** Kcal)

             1000-540-317= 143 ml

143x0.7=100.1 g

100.1x3.4 = 340.34

  H2O/Lytes 317 ml

              TOTAL    1000 ml/24 hrs=41.6 ml/hr

+    NO Lipids for now

**TOTAL**

**=** 664 kcals, 81g protein **(via TPN)** + 480 kcals **(via Propofol)** + 240 kcals, 21g protein**(via TF: Vital HP)**

**=**   **1384 kcal, 102 g protein (30 kcal & 2.2 g per IBW)**

\*Communicated to team

**Monitoring and Evaluation**:

### Monitor TG daily

Check FSG every 6-8 hours when PN starts

Monitor TF GI tolerance

Monitor and correct electrolytes PRN

Monitor I/Os-adjust fluids per d/w team

Monitor skin integrity

Obtain daily weights

Will cw monitoring: RD to follow as able.

### Monitor tolerance to feeds

* + signs of refeeding intolerance (distention, diarrhea, constipation, high residuals)
  + GI functions
* Monitor fluid status, electrolytes, blood glucose, triglycerides
  + Track daily intake/output to assess fluid status (anasarca, ECMO, CVVH).
  + Monitor Na, K, Mg, Phos, Ca, and bicarbonate levels.
  + Adjust fluid provision per MD recommendations.
  + Monitor **blood glucose** for hyperglycemia (adjust insulin if needed).
  + Monitor **triglycerides** (currently 684 mg/dL) before initiating lipids.
  + Assess **liver function (AST/ALT, bilirubin)** for TPN-related complications.
  + Monitor **renal function (BUN, creatinine)** due to AKI and CVVH.
* Monitor skin integrity, weight trends, pain.

**Level of Care: Level III (High)**

# II. Disease States

**Atrial fibrillation**

**1.Pathophysiology**

Atrial fibrillation (AF) is an irregular heartbeat, which can disrupt the flow of blood through the heart.1 It is responsible for 15–20% of cerebrovascular accidents (strokes). It occurs as electrical impulses become disorganized, preventing the atria from contracting properly. The risk factors for AF closely align with those for atherosclerosis and hypertension. Risk factors include high blood pressure, heart failure, atherosclerosis, diabetes, and advanced age, hyperthyroidism, and acute or chronic alcohol use.1 Clinical manifestation usually include irregular heartbeat, shortness of breath, fatigue, dizziness or syncope. Treatment typically involves medication.

**2. Statistics**

2.7-6.1 million people in the US have AF. Incidence of AF increases with age, and higher in men than women. African Americans are less likely than those of European decent to have AF.1

**3. Medical nutrition therapy**

Patients on warfarin (Coumadin) require education to maintain a consistent vitamin K intake, ensuring proper medication dosing and preventing fluctuations in blood clotting. Sudden increases or decreases in vitamin K intake can either enhance or reduce clotting, both of which are undesirable.1 Therefore, patients should be educated on vitamin K-rich foods and how to check dietary supplement labels for vitamin K content. Additionally, other nutrients that influence clotting should be consumed consistently. Omega-3 fatty acids can affect clotting, while vitamin E may reduce vitamin K absorption. The effects of herbal supplements on clotting are less understood, but garlic and Ginkgo biloba may increase bleeding risk.1 A DASH or Mediterranean diet is recommended to support overall cardiovascular health.

**Lap band surgery - Laparoscopic Adjustable Gastric Banding (LAGB)**

**1.Pathophysiology**

**LAGB procedure is considered a restrictive procedure by creating a smaller initial pouch for food consumption. A silicone ring or band is laparoscopically introduced into the abdominal cavity and secured around the upper part of the stomach.1 Inflation of the band can be adjusted where opening becomes narrower so that it delays emptying of the pouch. This gives patients sensation of fullness or satiety promoting restricting food intake and promoting weight loss. Potential complications** include band slippage, erosion, or infection. **Common symptoms** include nausea, vomiting, and difficulty swallowing (dysphagia) if the band is too tight.

**2. Statistics**

Lapband surgeries have declined due to the **higher success rates of gastric bypass and sleeve gastrectomy.** In 2011**, lap band surgery accounted for 35% of all bariatric surgeries**, but by 2018, it dropped to **less than 2%**.2 Most common in **adults with a BMI ≥35 who have failed non-surgical weight loss methods.**

**3. Medical Nutrition Therapy**

After surgery, dietary intake progresses through four phases to promote healing and adaptation to the new stomach size. Phase 1 (Liquids) includes clear liquids, followed by full liquids such as broths and protein shakes. Phase 2 (Pureed) introduces blended soft foods to prevent obstruction. Phase 3 (Soft foods) consists of well-cooked vegetables, tender meats, eggs, and soft fruits. Finally, Phase 4 (Regular diet) allows for a return to solid foods with small, frequent meals and careful chewing.1 Long-term dietary considerations include maintaining a high-protein intake (60–80g/day) is essential to preserve muscle mass. Patients should avoid high-fat and high-sugar foods to prevent nausea and vomiting. Proper hydration is important but drinking fluids 30 minutes before or after meals should be avoided to prevent pouch stretching. Additionally, food should be chewed thoroughly to reduce the risk of blockages.1

**Transient Ischemic Attack (TIA)**

**1.Pathophysiology**

Transient ischemic attack (TIA) are “mini strokes,” an episode of ischemia where blood flow is quickly restored and symptoms resolve within 24 hours. They are not considered to be strokes but are episodes of ischemia that lead to momentary symptoms consistent with loss of oxygen to the brain.1 There is a brief blockage of a cerebral artery often due to a small blood clot or embolism. Common risk factors include AFib, hypertension, diabetes, hyperlipidemia, smoking and atherosclerosis. Unlike a stroke, TIAs do not cause permanent brain damage but signal a high risk of future strokes. Clinical manifestations include sudden weakness or numbness on one side of the body, slurred speech or difficulty speaking, vision changes, loss of balance, dizziness or confusion, symptoms resolve within minutes to a few hours.

**2. Statistics**

TIA incidence in the United States could be around half a million per year, and estimates are about 1.1 per 1000 in the United States population. The estimated overall prevalence of TIA among adults in the United States is approximately 2%. It has been shown that previous stroke history increases the prevalence of TIA.3

**3. Medical Nutrition Therapy**

A heart-healthy and stroke-preventive diet focuses on reducing risk factors and promoting cardiovascular health.1 Following a DASH or Mediterranean diet can significantly lower stroke risk by emphasizing whole foods, lean proteins, and healthy fats. Increasing fiber intake helps regulate blood lipids and supports heart health, while omega-3 fatty acids from sources like fatty fish, flaxseeds, and walnuts provide anti-inflammatory benefits. Controlling risk factors is essential, including reducing sodium intake to less than 2300 mg/day (ideally <1500 mg/day) to manage hypertension and limiting saturated and trans fats to lower LDL cholesterol levels. Blood glucose management is also crucial, particularly for diabetics, as monitoring carbohydrate intake can help prevent vascular damage. Medication-nutrient interactions should be considered, especially for patients on anticoagulants like warfarin, who must maintain a consistent vitamin K intake to avoid fluctuations in blood clotting. Finally, weight and lifestyle management play a key role by encouraging weight loss (if overweight) and engaging in regular physical activity can significantly improve vascular health and reduce the risk of stroke.1

# III. Medications

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Drug** | **Indication** | **Contraindication** | **Effect of Drug on Nutrient Absorption & Utilization and Effect of Nutrient on Drug Absorption & Utilization** | **Side Effects** |
| Flagyl | Antibiotic, amebicide, antitrichomonal | Avoid with alcohol during use & for three days afterwards. Not with lactation. Increase risk of dental problems. Caution with severe decreased hepatic func or severe decreased renal func, geriatric or seizures. | consider low Na diet, take with meal to lower GI distress. food lowers bioavailability | Dry mouth, candidiasis, stomatitis, metallic taste, N/V, epigastric distress, diarrhea, constipation. Dizziness, headache, ataxia, fatigue, confusion, rash. |
| magnesium sulfate/D5W | Mineral supplement, antacid, laxative, osmotic | not with high fiber, oxalate, phytate. caution with decreased renal function and cardiac disease; not with ESRD and hypo calcemic. | take separately from fiber, fol and Fe by 2 hrs. adequate mg is needed for abs of Ca. high zinc increases mg excretion. | low BP in HTN. Hypotension, confusion, flushing, bradycardia |
| pantoprazole | Antigerd, antisecretory | avoid alcohol, not with lactation, caution with severe decreased hepatic function | take with regard to food; may decrease Fe, b12 absorption, maybe Ca supplementation. Avoid ginkgo | Headache, dizziness, cough, rash, muscle/back pain. Rare- hepatitis, pancreatitis, pneumonia |
| phosphorus | Treats or prevents hypophosphatemia | Severe hyperphosphatemia, hypocalcemia, or kidney failure | Supplementation improves cellular energy (ATP), but excess can bind with calcium and reduce absorption of both; monitor for refeeding syndrome in malnourished patients | Electrolyte imbalance, diarrhea (oral), soft tissue calcification (IV), hypotension |
| senna | laxative, stimulant | rectal bleeding, abdominal pain, nausea and vomiting, pregnancy | High fiber diets. 1500-2000mL fluid/day, electrolyte imbalances | increased intestinal peristalsis, bm in 6-12hrs, n/v, cramps, diarrhea, laxative dependence and loss of normal bowel function |
| nimbex | Used for paralysis in intubated or mechanically ventilated patients | Hypersensitivity to cisatracurium or other benzylisoquinolinium compounds | No direct effect on nutrient absorption, but paralysis requires enteral or parenteral nutrition; may delay gastric emptying indirectly due to sedation and immobility | Bradycardia, hypotension, rash, prolonged paralysis |
| fentanyl | Severe pain  management | Severe respiratory  disease, caution in  elderly | May cause  constipation, slowing  GI motility and  nutrient absorption | Respiratory depression,  dizziness, nausea,  sedation |
| epinephrine | Used in shock, cardiac arrest, or severe allergic reactions | Narrow-angle glaucoma, non-anaphylactic shock in elderly patients, certain heart rhythm disorders | May increase metabolism and energy needs during stress response; not directly impacted by diet, but caution with caffeine or stimulants which can intensify effects | Anxiety, tremors, palpitations, hypertension, arrhythmia |
| vasopressin | Used to increase blood pressure in vasodilatory shock | Chronic nephritis, hypersensitivity to vasopressin | Can cause water retention and hyponatremia; may affect fluid and electrolyte balance, especially sodium | Hyponatremia, headache, abdominal cramps, hypertension |
| levophed | Severe  hypotension | Hypovolemia,  caution with  hypertension,  arrhythmias | May interact with  caffeine, worsening  hypertension | Headache, arrhythmias,  increased BP |
| propofol | Sedation/anesthesia | Allergy to soy/egg,  caution with  hyperlipidemia | Provides calories (1.1  kcal/mL as fat); must  be considered in total  calorie intake | Hypotension, increased  triglycerides, respiratory  depression |

# IV. Labs

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Pt Labs** | **Patient Value** | **Reference Range** | **Elevated or Depressed or**  **WNL?** | **Reasons for Elevation** | **Reasons or Depression** |
| GLUCOSE | 197 | 70-110 mg/dL | Elevated | Diabetes Mellitus, acute stress response, excessive consumptions of carbohydrates, Cushing syndrome, acute pancreatitis, and/or corticosteroid therapy | Insulinoma, hypothyroidism, hypopituitarism, extensive liver disease, and/or insulin overdose |
| NA | 135 | 136-145 mEq/L | Depressed | Diuretics, fluid loss, dehydration, excessive sodium intake, diabetes insipidus, excessive sweating, and/or steroids | Diuretics, Syndrome of inappropriate antidiuretic hormone secretion (SIADH), cirrhosis, renal failure, and/or NSAIDS |
| K | 4.3 | 3.5-5 mEq/L | WNL | Excessive intake, hemolysis, infection, crush injury to tissues, aldosterone-inhibiting diuretics, acidosis, and/or dehydration | Diuretics, inadequate intake, burns, Cushing syndrome, renal tubular acidosis, ascites, trauma, and/or surgery. |
| CHLOR | 105 | 96-106 mEq/L | WNL | Dehydration, metabolic acidosis, and/or respiratory alkalosis from hyperventilation | Overhydration, prolonged vomiting or gastric suction, diarrhea or high output fistula, and/or metabolic alkalosis |
| CO2 | 17.0 | 24-29 mEq/L | Depressed | Respiratory alkalosis, metabolic acidosis, renal failure, and/or ketoacidosis | Metabolic alkalosis, and/or hypoventilation |
| BUN | 21 | 5-20 mg/dL | Elevated | Shock, sepsis, burns, dehydration, GI bleed, hypovolemia, excessive protein ingestion, starvation, and/or renal disease or failure. | Inadequate protein, malnutrition, overhydration, SIADH, liver failure, and/or nephrotic syndrome |
| CA | 7.7 | 9-11 mg/dL | Depressed | Hyperparathyroidism, hyperthyroidism, breast/lung/kidney cancer antigen, and/or vitamin A toxicity | Hypoalbuminemia, hypomagnesemia, hyperparathyroidism, hyperphosphatemia, renal failure, and/or steroid use |
| CREAT | 0.74 | 0.6-1.2 mg/dL | WNL | Acute tubular necrosis, pyelonephritis, and/or reduced renal blood flow | Debilitation, and/or decreased muscle mass from muscular dystrophy or myasthenia gravis |
| MAGNESIUM | 2.8 | 1.3-2.1 mEq/L | Elevated | Renal failure, dehydration, acidosis, hypothyroidism, adrenal insufficiency, prolonged intake of Milk of Mag | Malabsorption, diarrhea, fistula, GI surgery, renal losses, alcoholism, meds (diuretics), refeeding syndrome, acute pancreatitis |
| PHOSP | 2.1 | 3-4.5 mEq/L | Depressed | VitD excess, acidosis, laxatives, renal impairment | Impaired absorption, vit D deficiency, diarrhea, meds (phos binders, insulin), alcoholism, refeeding syndrome |
| TRIG | 684 | <160 mg/dL  TPN <250-400 mg/dL | Elevated | Hyperlipidemia, hypothyroidism, high-CHO diet, poorly controlled DM, nephrotic syndrome, HTN, alcohol cirrhosis, MI | Malabsorption syndrome, malnutrition, hyperthyroidism |
| CHOL, HDL | <5 | >70 mg/dL | Depressed | Genetic disorders, severe illness, inflammation, very low fat intake | Malnutrition, chronic disease, smoking, physical inactivity |
| AST | 360 | 0-35 units/L | Elevated | Liver dz: hepatitis, hepatic cirrhosis, drug-induced liver injury, hepatic metastasis, necrosis or injury  Skeletal muscle dz: skeletal muscle trauma, recent non-cardiac surgery, multiple traumas, burn, primary muscle dz (myopathy, myositis)  Other dz: acute hemolytic anemia, acute pancreatitis | Acute renal dz, beriberi, diabetic ketoacidosis, pregnancy, chronic renal dialysis |
| ALT | 12 | 4-36 units/L | WNL | Hepatitis, hepatic necrosis, hepatic ischemia, cirrhosis, cholestasis, hepatic tumor, hepatotoxic drugs, burn, trauma to striated muscle, myositis, pancreatitis, MI, shock | Chronic liver disease, malnutrition, vitamin B6 deficiency |
| CHOL, TOT | 102 | <200 mg/dL | WNL | Hypothyroidism, high-fat diet, nephrotic syndrome, genetics | Malnutrition, chronic illness, liver disease, malabsorption |

# V. References

1. Nelms M, Sucher KP. *Nutrition Therapy and Pathophysiology*. 4th edition. Cengage Learning; 2019.

2. Estimate of Bariatric Surgery Numbers, 2011-2022. American Society for Metabolic and Bariatric Surgery. June 27, 2022. Accessed March 23, 2025. <https://asmbs.org/resources/estimate-of-bariatric-surgery-numbers/>

3. Panuganti KK, Tadi P, Lui F. Transient Ischemic Attack. In: *StatPearls*. StatPearls Publishing; 2025. Accessed March 23, 2025. <http://www.ncbi.nlm.nih.gov/books/NBK459143/>

4. Pronsky ZM, Patricia J. *Food Medication Interactions: The Foremost Driug-Nutrient Interaction Resource*. 17th Edition. Food Medication Interactions Publications; 05/12.