

**Case Study #2: Small Bowel Obstruction with
Complications and Total Parenteral Nutrition**

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Nutrition Assessment:

Description

Name: CK Age: 64 y/o Sex: M

Admission Diagnosis: Short Bowel Obstruction

Social Hx: CK is a white man with a college degree and is no longer working. He lives in San Francisco by himself. He visits his mother occasionally, has a sister but has not speak with her much until his hospitalization.

Health Status:

Pmhx: HIV/AIDS, Hep C, Pancreatitis s/p partial pancreatectomy, T1DM, Splenectomy, anal CA s/p hemicolectomy, cholecystectomy, duodenectomy, and hx of multiple abdominal surgeries.

Signs/Symptoms: Abdominal pain

Literature Review

The small intestine (SI) is an organ with digestive functions. It breaks down food into nutrients and absorbs the nutrients. Bowel obstruction can be functional or mechanical, mechanical obstruction occurs when the digestive tract is physically blocked either partially or completely from carcinomas, adhesions, and diverticulitis.¹ As a result, food, fluids, gas, and stool is prevented from passing. The signs and symptoms of an intestinal obstruction include abdominal pain, vomiting, bloating, constipation, abdomen swelling, and loud bowel sounds.² Treatment for bowel obstructions can be done non operative management with partial small bowel obstruction (SBO), and laparoscopic resection, or bowel resection for a complete obstructed bowel. Even with multiple resections of the SI tract, it is able to adapt and compensate to continue its functions,³ however after multiple abdominal surgeries, fibrous tissues and adhesions form increasing the risk for reoccurrences of bowel obstructions.⁴ Abdominal

adhesions can cause intestinal obstruction by twisting or pulling intestines out of place, resulting in a partial or complete restriction of the movement of food.⁵ Patients may require alternative form of nutrition such as total parenteral nutrition(TPN) to provide nutrition support with chronic intestinal obstruction.⁶

CK has had an extensive history of multiple abdominal surgeries and presented to the hospital with SBO, likely due to adhesions of fibrous tissues. CK had a procedure on 12/23/15 for laproscopic exploratory and lysis adhesions and had feculent spillage into peritoneal cavity. CK was hypotensive during his procedure and required pressor support and intubation in ICU. On 01/01/15 pt had another procedure, his small intestine was resected, stomach transected, and was found to have a necrotic duodenum, multiple drains were placed in his abdomen. Since this procedure, there is no access to his digestive tract and as a result CK required TPN for nutrition support. Until the gastrointestinal tract is reconnected, CK will be unable to have any oral or enteral nutrition.

Anthropometric Data:

Height: 1.77m (5'10) Admit Weight: 55kg (121#) IBW: 75.4kg (166#) 73%IBW

BMI 17.5 kg/m² (Underweight)

Weight hx:

01/01/15	68.1kg (150#) increased r/t fluid retention
12/20/14	55.0kg (121#)
12/04/14	55.7kg (122#)
11/19/14	54.4kg (119#)
10/08/14	54.6kg (120#)

Biochemical Data:

Lab	Reference Range	01/01/15	01/02/15	Reason
Na (mEq/L)	133-145	141	140	WNL
K (mEq/L)	3.5-5.3	4.2	3.9	WNL
Cl (mEq/L)	100-111	110	111	WNL
BUN (mg/dL)	7-27	14	21	WNL
Creat (mg/dL)	<=1.11	0.66	0.89	WNL
Corrected Ca	8.5-10.3	8.4 (L)	--	Low serum ALB.
Mg (mg/dL)	1.7-2.3	2.1	1.7	WNL
Phos (mg/dL)	2.7-4.5	3.1	4.0	WNL
Gluc (mg/dL)	60-159	198 (H)	209(H)	Partial pancreatectomy
ALB (g/dL)	3.7-5.7	1.6 (L)	--	Multiple abdominal surgeries, malnutrition, HIV/AIDS infection.

Mediations:

Medication	Rationale	Drug/Nutrient Interaction
Calcium Chloride	Replete calcium	Anorexia, nausea, thirst
Candidas	Anti-fungal	Nausea, vomiting, diarrhea
Fentanyl	Analgesic, narcotic, opioid	Constipation, diarrhea, dry mouth
Sliding Scale Insulin	Lower blood glucose	Alcohol increases hypoglycemia
Keppra	Anti-epileptic, anti seizures	Anorexia

Norepinephrine	Vasopressor for hypotension	Decreased GI permeability, absorption
Pantoprazole	Anti-GERD, antisecretory	Lower absorption of iron, Vit B12, neausea
Vancomycin	Antibiotic	Lower GI absorption, nausea
Zosyn	Antibiotic	Increases K absorption, caution with K supplemnt

Food/Nutrition-related History:

Diet order: NPO (CK has disconnected bowel)

Usual eating pattern: CK had a poor appetite prior to admission r/t HIV/AIDS and hx of GI problems. He usually ate 2 meals a day, sometimes with snacks in between. Snacks he ate included crackers or a fruit. He cooks for himself at home, and eats out at restaurants three times a week.

Estimated Nutrition Needs:

Calories: (35-38kcal/kg admit wt) 1925-2100kcal/day Pt has increased needs r/t underweight status and cachetic appearance.

Protein: (1.8-2.0gm/kg admit wt) 100-110g/day Protein needs are increased r/t high GI output via drains, pt has severe protein calorie malnutrition, and appears cachetic.

Fluids: ~2000ml/day or per MD

Nutrition Diagnosis

Malnutrition (NI-5.2) related to HIV/AIDS as evidenced by a BMI of 17.5kg/m² and loss of lean body mass.

Limited food acceptance (NI 2.9) related to disconnected bowel as evidenced by NPO status and lack of access to the GI tract.

Goals:

1. Meet estimated nutrition needs within a week of starting TPN.
2. To maintain current weight or gain muscle weight to meet a normal BMI.
3. Maintain electrolytes within normal limits as CK is at high risk for refeeding syndrome.

Intervention:

1. Start Total Parenteral Nutrition via PICC line tonight for nutrition support. TPN order started with low dextrose because patient was at high risk for refeeding syndrome.

TPN order: Rate 65ml/hr
 Dextrose 10%
 Amino Acids 5.5%
 Lipids 0%
 Na 77mEq/L
 K 35 mEq/L
 Ca 10 mEq/L
 Mg 10 mEq/L
 Phos 9 mEq/L
 Chloride Acetate Ratio: Balanced
 MVI 10ml
 Trace Elements 0.5ml
 Zinc 10mg
 Vitamin C 500mg
 Thiamine 200mg

2. Provide TPN nutrition to meet >80% of estimated needs to prevent further weight loss.
3. Check electrolytes labs daily, adjust TPN order as needed, replete as needed as pt is at high risk for refeeding.

Monitoring and Evaluation:

Lab	Reference Range	01/01/15	01/02/15	01/05/15	01/06/15	01/08/15
Na (mEq/L)	133-145	141	140	145	149 (H)	142
K (mEq/L)	3.5-5.3	4.2	3.9	2.9 (L)	2.4 (L)	3.5
Cl (mEq/L)	100-111	110	111	110	111	106
BUN (mg/dL)	7-27	14	21	11	11	17
Creat (mg/dL)	<=1.11	0.66	0.89	0.72	0.86	0.64
Corrected Ca	8.5-10.3	8.4 (L)	--	--	9.1	9.4
Mg (mg/dL)	1.7-2.3	2.1	1.7	1.9	1.7	2.6 (H)
Phos (mg/dL)	2.7-4.5	3.1	4.0	3.0	2.0 (L)	1.9 (L)
Gluc (mg/dL)	60-159	198 (H)	209(H)	113	235 (H)	108
ALB (g/dL)	3.7-5.7	1.6 (L)	--	--	--	--

Lab	Reference Range	01/12/15	01/13/15	01/14/15	01/15/15
Na (mEq/L)	133-145	134	133	136	139
K (mEq/L)	3.5-5.3	4.2	4.0	3.8	4.3
Cl (mEq/L)	100-111	103	102	100	98 (L)
BUN (mg/dL)	7-27	19	16	14	15
Creat (mg/dL)	<=1.11	0.56	0.56	0.61	0.57
Corrected Ca	8.5-10.3	9.3	8.6	8.6	9.1
Mg (mg/dL)	1.7-2.3	1.8	1.9	1.9	2.0

Phos (mg/dL)	2.7-4.5	2.8	2.6 (L)	2.4 (L)	3.4
Gluc (mg/dL)	60-159	142	156	183 (H)	159
ALB (g/dL)	3.7-5.7	2.0 (L)	--	--	--

- At the initial start of TPN, pt had signs of refeeding syndrome with Low K, Phos, and Mg, however with days of repletion and adjusting electrolytes in TPN based on how much pt needs, electrolytes were stable.

- Thiamine was supplemented in TPN to help alleviate refeeding syndrome. Thiamine acts as a cofactor in carbohydrate metabolism.

- Pt initially received only ~45% of nutrition needs because of his high risk for refeeding syndrome, it was gradually increased and pt was meeting nutrition needs by day #4 of TPN (01/08/15).

- Pt lost ~5# since his admission, this could be related to fluid losses vs actual mass. Now that pt is meeting his nutritional goals, pt will likely maintain or gain weight.

- Chem 10 was ordered daily, electrolytes were monitored daily and TPN orders changed each day to either increase electrolytes to WNL or maintain it. Pt had high GI and renal output from drains connected to bowel, jejunum, and colon, therefore he had high repletion requirements from the medical team as well as high requirements for TPN. Now that pt no longer have signs of refeeding, electrolyte repletion requirements are minimal, however remain high in TPN bag.

- Protein requirements were further increased r/t high protein loss through GI drains, as a result amino acids were increased in TPN as well as TPN bag volume to accommodate this.

- Pt has partial pancreatectomy, insulin production is limited therefore pt needs insulin in TPN bag, which was added after the first day. In addition, pt was on a low sliding scale insulin regimen.

Summary/Conclusion

It will be a long process until pt will be able to use GI tract, to improve patient's stay surgery team has recently approved pt to have ice chips and sips of water. These fluids would drain out via gastric drain to gravity. CK will continue to require TPN for nutrition support until the digestive track is reconnected. Lipids were added to CK's TPN bag after two weeks without, it will be given on Mondays, Wednesdays, and Fridays to better meet his nutrition needs. Triglyceride labs will be checked weekly. Estimated nutrition needs remain high because of underweight, wound healing, and high volume of abscess drainage. Unfortunately because CK does not have a connected GI tract he is unable to take his antiretroviral medications and there is none available via IV. CK remains at high infection risk as his baseline immune system is suppressed. For now CK will continue TPN support with daily monitoring of electrolytes and tolerance.

References

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