*Northern Illinois University*

Care Plan II

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Sherman Hospital, Elgin, IL

July, 2013

**Case Summary**

R.F. is a 70 y/o female who has metastatic cancer which includes the pancreas and omentum, a history of bladder and bile duct cancer, and a history of a Whipple procedure. She had just completed chemotherapy at the end of June and has plans to start radiation therapy. She was admitted on July 9, 2013 with a diagnosis of SBO. She was admitted to a prior hospital with this diagnosis approximately one week ago. No progress was made since. She was transferred to Sherman, where after a diagnostic procedure it was decided that there was no way to bypass the SBO. TPN was started and expected to last about 90 days until a stent could be placed in order for her to eat. She was discharged on TPN on July 15. She was followed by the dietitian from July 10 to July 15 with one assessment and 5 follow ups.

**Initial Nutrition Assessment (July 10, 2013)**

**Food and Nutrition History**

* Diet PTA regular, poor PO intake for ~1 week.
* Diet recall for July 8 included only about 1 yogurt which did not settle well, some coffee, and tea. She said she felt like what she had eaten was just “sitting there” in her GI system. On July 9, she just had tea throughout the day.
* Analysis of diet recall and interview results
	+ The recall clearly shows that PO intake is insufficient providing only around 100-200 kcal a day with insufficient macronutrients and micronutrients
	+ Barriers to the patient’s consumption: SBO, post chemotherapy, and history of Whipple procedure.
* Nutrition knowledge and practices: understanding of guidelines recommended following a Whipple procedure and the necessity of good nutrition and increased nutrient needs during cancer treatment.
* Physical activity: N/A
* Food availability: Efficient

**Biochemical data, medical tests, and procedures**

Lab data

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Lab | 7/10 | 7/11 | 7/12 | 7/13 | 7/14 | 7/15 | Normal Range | Explanation |
| Glucose | 152\* | 181\* | 134\* | 112\* | 152\* | 160\* | 70-99 mg/dL | Surgery, stress, and diagnosis of cancer. |
| BUN | 7 | 7 | 9 | 9 | 12 | 14 | 6-20 mg/dL | WNL |
|  |  |  |  |  |  |  |  |  |
| Creat. | 0.62 | 0.58\* | 0.55\* | 0.55\* | 0.57\* | 0.59\* | 0.60-1.30 mg/dL | Decreased muscle mass and age. |
| BUN/Creat. Ratio | 11:1 | 12:1 | 16:1 | 16:1 | 21:1\* | 24:1\* | 10:1-15:1 | >20 may be an indication of poor hydration. |
| Na | 140 | 137 | 136 | 139 | 135\* | 136 | 136-145 mEq/L | Insignificant, likely d/t elevated blood sugars. |
| K | 3.5 | 3.3\* | 3.6 | 3.6 | 4.3 | 4.3 | 3.5-5.0 mEq/L | Malnutrition, malabsorption, pancreatic cancer. |
| Chloride | 107 | 102 | 100 | 99 | 98 | 99 | 98-107 mEq/L | WNL |
| TCO2 | 24 | 26 | 28 | 30\* | 28 | 29 | 22-29 mmol/L | Insignificant |
| Calcium (Adjusted for low albumin) | 8.2 (9.5) | 8.2 (9.7) | 8.3 (9.8) | 8.9 (10) | 9.2(10) | 9.4(11\*) | 8.4-10.2 mg/dL | Cancer |
| Phosphorus | -- | 2.6 | 2.3 | 2.9 | 3.3 | 4.8\* | 2.3-4.3 mg/dL | Cancer |
| Magnesium (Adjusted for low albumin) | -- | 1.5(1.7) | 1.9 (2.1) | 2.1 (2.3) | 2.1(2.3) | 2.5 | 1.6-2.6 mg/dL | WNL |
| Triglycerides | -- | 83 | -- | -- | -- | -- | <150 mg/dL | WNL |
| Total protein | 5.2\* | 4.5\* | -- | 5.7\* | -- | -- | 6.4-8.3 g/dL | Malnutrition, low protein consumption. |
| Albumin | 2.4\* | 2.1\* | -- | 2.2\* | -- | -- | 3.5-5.0 g/dL | Malnutrition, malabsorption, surgery, cancer |
| Prealbumin | -- | 5.0\* | -- | -- | -- | -- | 18-38 mg/dL<10 indicates significant malnutrition | Malnutrition, stress, catabolic state, low protein intake, surgery. |
| POC/accu-check | -- | 212\*237\* | 175\*158\* | 146\*147\* | 141\*123\* | 170\*123\* | 70-99 mg/dL | Surgery, stress, and diagnosis of cancer. |
| Platelet | 391 | -- | -- | 291 | -- | -- | 150-450 K/cumm | WNL |
| WBC | 8.7 | -- | -- | 8.7 | -- | -- | 4-11 K/cumm | WNL |
| RBC | 3.05\* | -- | -- | 3.32\* | -- | -- | 4.2-6 m/cumm | Blood loss from surgery. |
| Hct | 31\* | -- | -- | 33 | -- | -- | 36-51% | Blood loss from surgery. |
| Hgb | 10.2\* | -- | -- | 11 | -- | -- | 12-17 g/dL | Blood loss from surgery. |
| Temperature | 99.1 | 97\* | 98 | 97\* | 97\* | 98 | 98.7-99.1 F | Anemia resulting from blood loss and poor PO intake. Anemia may lead to lower body temperature. |
| Resp. rate | 18 | 18 | 18 | 16 | 16 | 18 | 14-20 br/min | WNL |
| Pulse | 104\* | 90 | 66 | 75 | 70 | 70 | 60-100 bpm | Insignificant |
| Systolic BP | 92 | 113 | 110 | 133 | 150 | 150 | 90-140 mmHg | WNL |
| Diastolic BP | 68 | 61 | 68 | 85 | 80 | 80 | 60-90 mmHg | WNL |

\*Abnormal Value

* The abnormal values are likely caused by a combination of stress, a recent surgery, poor PO intake for ~10 days d/t SBO, weight loss, hypercatabolic state and increased needs from metastatic cancer, and recent chemotherapy. Note that glucose remained elevated throughout admission. Contributing factors would include stress, surgery, and malnutrition. It was highest on 7/11 d/t TPN initiation after period of poor PO intake. During the patient’s stay, it was monitored and addressed with insulin added to the TPN bag and eventually sliding scale insulin initiated on 7/12. Also, BUN/creatinine ratio indicates dehydration on 7/14 and 7/15. However, sodium remained in a normal range, the creatinine was abnormally low, and the fluids provided through the IV were actually increased on 7/14-15.
* Tests
	+ Chest X-ray showed nonsignificant results. New left central venous catheter present.
	+ Surgery on 7/9 included exploratory laparotomy, resection omental mass, and stamm gastrostomy.
		- Omentum found very indurated and hard, biopsies taken showed recurrent adenocarcinoma. Omentum was resected off of the abdominal wall.
		- The omentum wrapped around the efferent loop and the metastatic disease occluded the efferent loop. No way to bypass.

**Anthropometrics**

* 70 y/o female
* Height 5’1”, IBW 105 +/- 10%
* 150#, 68 kg on 6/20 which is 143% IBW, BMI 28
* 136#, 62 kg on 7/10 which is 130% IBW, BMI 26
* This indicates a 14# weight loss (9%) over ~3 weeks which is severe.
* Both of the BMI and 130% IBW indicate that she is overweight. >130% IBW is considered obesity.
* Due to her current weight being >120% IBW, an adjusted body weight of 113# (51 kg) was used to calculate her needs.
* The following needs are increased due to mets. cancer, current treatment plans, and recent severe weight loss.
	+ 1530-1785 kcal (30-35 kcal/kg)
	+ 61-77 g protein (1.2-1.5 g/kg)
	+ 1530-1785 ml fluid (1 ml/kcal) or 1440-1680 ml fluid (30-35 ml/kg IBW).

**Physical Exam Findings**

* Oral health and mental status non-significant.
* Physical appearance: Hair loss due to chemotherapy.
* Muscle/subcutaneous fat wasting not physically observed.
* GI Tract Assessment

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Date | Bowel Sounds | Flatus | Abdomen Description | BM |
| 7/10 | Hypoactive | Negative | Symmetrical | Last BM 1 week ago. |
| 7/11 | Hypoactive | Negative | Symmetrical | Negative |
| 7/12 | Positive | Negative | Symmetrical | Negative |
| 7/13 | Positive | Negative | Symmetrical | Negative |
| 7/14 | Hypoactive | Positive | Symmetrical | Positive |
| 7/15 | Positive | Positive | Symmetrical | Last on 7/14 |

**Client History**

* Medications

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Medication | Category | Mechanism | Dosage | Normal Dose | Nutrition |
| Prednisolone ophthalmic | Anti-inflammatory | Given to reduce inflammation in eyes following radiation. Influences the immune system to prevent redness or swelling. | 1 BID eyedrop | 2 drops q 4 hours | Likely nonsignificant side effects d/t low dose. |
| Morphine  | Opioid, analgesic | Works by mimicking endorphins. | 2 mg 2 hr. prn | 5-40 mg 4 hours prn | Possible side effects include N/V, dry mouth, constipation, diarrhea. |
| Hydromorphine | Opioid, analgesic | Works by mimicking endorphins. | 30 mg q day | 5-40 mg 4 hours prn | Possible side effects include N/V, dry mouth, constipation, diarrhea. |
| Naloxone (Narcan) | Opioid antagonist | Designed to reduce rate of opioid overdose, given if high doses of opioid are provided. Also helps reduce side effects of opioids. | 0.4 mg/ml q 2 min. prn | 0.4 mg/ml q 2-3 minutes prn | N/V, hypertension |
| Ketorolac | Anti-inflammatory, nonsteroidal, ocular | Inhibition of prostaglandin synthesis by competing with enzyme cyclooxygenase. | BID eye drops prn | 1 eye drop 4 times a day or prn | Fluid retention |
| Lisinopril | AntiHTN | Lysine-analog of enalapril, ACE inhibitor. | 2 mg q day | 4 mg q day | May increase serum K levels. |
| Enoxaparin (Lovenox) | Anticoagulant | Binds to and accelerates activity of antithrombin III. Causes inhibition of coagulation factors Xa and IIa. | 40 mg | 1 mg/kg every 12 hours. | Diarrhea, brownish/orange urine, and drug will chelate with iron. |
| Cefoxitin | Antibiotic | Inteferes with cell wall synthesis. Strong beta-lactamase inhibitor. | 2 g q day | 1 g every 6-8 hours | Nonsignificant |
| Pantoprazole (protonix) | Proton Pump Inhibitor | Binds irreversibly to H+K+ATPase (Proton pumps) and inhibits the secretion of acid. | 40 mg PO q day | 40 mg q day, 7-10 days | Abd. Pain, diarrhea, nausea. Long-term may cause hypomagnesemia. Decreased B12 absorption. |
| Ondansetron (Zofran) | Antiemetic, Antinauseant | Serotonin 5-HT3 receptor antagonist. | 4 mg PO q 6 hr | 8 mg, then 1 mg per hour over 24 hrs | May cause abd. pain, constipation, diarrhea, fatigue. |
| Insulin Aspart (Novolog) added 7/12 | Fast acting insulin analog | A single amino acid was slightly changed in its molecular structure allowing it to be absorbed quickly into the bloodstream. | 2-10 unit sliding scale | 0.7-2.5 units/kg/day | Hypoglycemia |

* The medication’s side effects are the same that may occur during radiation treatment including constipation, diarrhea, fatigue, pain, and N/V. The patient would be treated both medically and nutritionally if any of these were to arise. She was also already receiving Zofran and had an ostomy to suction, both of which can help relieve abdominal pain, nausea, and vomiting. Most of these medications are given to relieve and/or prevent side effects. The antibiotics are the most likely to cause a side effect and the ocular medications are given at a small dose and thus less likely to cause any side effects.
* Also given IV with D5W 0.45% NaCl @ 100ml/hr.
* On 7/11, was given potassium 40 mEq and Mg Sulfate rider to replenish low serum levels.
* Important medications to note include Protonix, Cefoxitin, and Potassium/Mg sulfate.
* PTA Medication

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Pantoprazole (protonix) | Proton Pump Inhibitor | Binds irreversibly to H+K+ATPase (Proton pumps) and inhibits the secretion of acid. | 40 mg PO q day | 40 mg q day, 7-10 days | Abd. Pain, diarrhea, nausea. Long-term may cause hypomagnesemia. Decreased B12 absorption. |
| Lisinopril | Antihypertensive | Lysine-analog of enalapril, ACE inhibitor. | 2 mg q day | 4 mg q day | May increase serum K levels. |

* Supplement usage: MVI
* Medical history: Completed chemotherapy end of June, pancreatic cancer, cholangiocarcinoma 1/30, adhesiolysis and whipple procedure 1/29, bladder cancer, cystectomy with neobladdar ’97, skin cancer, hysterectomy, cataracts, macular degeneration, hypertension.
* Allergies: NKFA
* Social: No history of drinking or smoking.
* Family History: Noncontributory.

**Medical Diagnosis: Cancer**

R.F. had a diagnosis of cholangiocarcinoma during her last admission at Sherman in January of 2013 and underwent a Whipple procedure during the same admission.The Whipple procedure is a procedure most often performed for patients with pancreatic cancer. It may be performed for a tumor in structures near the pancreas including the common bile duct, the ampulla of Vater, or the duodenum (2). In this case, the patient had cholangiocarcinoma confined to the distal bile duct. During the surgery, the tumor was found to be touching the pancreas but not determined to be metastatic at the time of the surgery. The Whipple surgery is also termed a pancreaticoduodenectomy because it removes part of the pancreas and all or most of the duodenum. A cholecystectomy is performed as part of the surgery as well (2). The stomach is then connected to the jejunum. According to this patient’s surgical report, toward the end of the procedure the MD performed both an end-to-side pancreaticojejunostomy and an antecolic gastrojejunostomy. Following the procedure she was seen by a dietitian and educated on the gastrectomy diet.

Around 1997, R.F. was diagnosed with bladder cancer around the age of 54 or 55. The majority of people diagnosed with bladder cancer are greater than 55 with an average age of 73 (3). Therefore she was diagnosed at a young age. She received a neobladder because of this diagnosis. It is rare for bladder cancer to spread to distant areas in the body and only occurs in about 4% of bladder cancer cases (3). Therefore, it is likely that her cholangiocarcinoma was a different cancer unrelated to the bladder cancer in 1997. However, the cholanigocarcinoma is likely the cause of the pancreatic and omentum cancers she is currently in the middle of receiving treatment for. If this is true, it would mean that the Whipple procedure failed to remove all of the cancer cells. Bile duct cancer occurs in 2000 to 3000 people in the U.S. and, when advanced, usually spreads to the peritonium (including the omentum), the liver, or the lungs (3). The main risk factor for bile duct or gallbladder cancer is the development of gallbladder or bile duct stones. Previous exposure to chemotherapy or radiation treatment can also be a risk factor for other cancers. Obesity, greater than 65 years old, smoking, inflammatory bowel syndrome, family history and exposure to certain harmful chemicals are other risk factors for bile duct cancer (3). However, not enough history is available on this patient to determine her true risk factors.

Adenocarcinoma is the type of cancer most common in the gallbladder and it is known to develop in gland-like structures of the body (3). The cancer found as a result of this patient’s omentum biopsy was adenocarcinoma. If the gallbladder was the primary cancer site, that would mean that the cancer cells that have grown in the pancreas and omentum are actually bile duct cancer cells growing on the other organs and therefore not pancreatic cells or omentum cells. This is because the cells of the primary site are the origin of the metastasis sites in advanced cancer and thus do not grow from the new organ or site cells (3, 4). There are different ways that cancer can spread. Overall, the spread of cancer from its primary location to another place in the body is termed metastasis. Local invasion is when cancer will grow to invade nearby tissues (4). Cancer may also invade other areas of the body by intravasation and circulation. This is when the cells move through the walls of nearby vessels and by doing so can enter into either the bloodstream or the lymphatic system depending on the vessels invaded. In these systems, they can circulate through vessels to other areas of the body. When the cells stop during circulation and migrate again beyond the walls of the circulatory vessels known as extravasation, they can form new tumors in the surrounding tissues which is referred to as micrometastasis (4).

Nutrition therapy for cancer includes treating side effects that may occur depending on the cancer site, the cancer treatment, and the patient’s individual reaction to these. Side effects may include nausea, vomiting, mouth sores, thick saliva, diarrhea, constipation, malnutrition, malabsorption, pain, and more. Side effects most common in pancreatic and biliary cancers include nausea, vomiting, stomatitis, and diarrhea from treatment; and malabsorption, development of diabetes, and dysgeusia from the tumor site (5). Weight loss and cachexia are common as well. Ensuring nutritional adequacy will help prevent loss of muscle mass, increased fatigue, and weight loss. Nutrition support may be necessary in certain situations such as when oral feedings are poorly tolerated, inadequate PO intake < 50% for 1 week or more, bowel obstruction, high-output fistula, high aspiration risk, or severe malabsorption. High intakes of antioxidants including beta-carotene, vitamin C, and vitamin E may increase tumor response to treatment and decrease treatment toxicity to the rest of the body (5). Goals during cancer treatments would be to reduce toxicity of treatments, resolve treatment related side effects, ensure nutritional adequacy and nourishment, prevent malnutrition, and improve quality of life (5).

**Disease process, patho-physiology, nutrition implications: Small Bowel Obstruction (SBO)**

Following her admission in January, R.F. was diagnosed with pancreatic carcinoma which is recurrent. During this recent admission, she received a surgery on 7/9 including an exploratory laparotomy, resection of omental mass, and stamm gastrostomy. During the surgery, it was found that the omentum was hardened, wrapped around the efferent loop, and, when biopsied, found to be recurrent adenocarcinoma. It caused the unavoidable SBO obstruction by wrapping around the efferent loop, which is one of the loops of the small intestine that travels away from the center of the body. The omentum is a part of the peritoneum that surrounds abdominal organs and includes the greater and lesser omentum (2). The greater omentum is a fold in the peritoneum that hangs from the stomach and passes by the small and large intestines before turning back on itself and ending at the abdominal wall. The lesser omentum is another fold of the peritoneum that extends from the liver to the bottom of the stomach and the duodenum (2).

A bowel obstruction beyond the ligament of Treitz due to either incurable primary cancer in the inner abdomen or primary cancer outside of the abdomen that has spread to the intra-peritoneal area is considered a malignant bowel obstruction or MBO (6). An MBO is a common occurrence in advanced stages of cancer. If paired with a poor nutritional status, ascites, heavy tumor burden, or a history of extensive chemotherapy or radiation, the prognosis is commonly poor. A MBO may be treated with surgery, endoscopic stenting, chemotherapy, or simply medically managed (6).

Chakraborty, Selby, Gardiner, Myers, Moravan and Wright performed a study involving 57 patients admitted to oncology or GI inpatient services throughout their hospital stay and after discharge (6). Each patient was followed either until their death or until the end of the 2 year study. Every patient had a diagnosed MBO. Using the Eastern Cooperative Oncology Group (ECOG) performance status scale, results showed that those MBO patients that received chemotherapy and/or surgery had lower scores than those who did not indicating that chemotherapy and surgery may improve or elongate the patient’s functional status. Unfortunately, by the end of the study, 32 out of the 35 participants had died with survival rates varying from 7 to 873 days and a medium of 80 days. Out of the 26 that were discharged home, 23 were readmitted. Readmission was due to MBO reoccurrence in 11 of them, post op complications in 2, or other unrelated illnesses in 10 of the 23 readmissions. Finally, out of the 57 study patients, six people were found that survived longer than one year post-MBO diagnosis. Five of the six had post-MBO chemotherapy and four had surgery (6).

When comparing patients with and without TPN therapy, Chakraborty et al. found no differences in the ECOG scores (6). Other studies conflict with these results. One review of 115 patients with a diagnosed MBO found that 10% survived one year or more after starting TPN (6). TPN may prolong life or be helpful in supporting patients awaiting further cancer treatment such as surgery or chemotherapy. Another study examining the use of home TPN in terminally ill cancer patients, found 31% of patients receiving TPN lived more than one year beyond the start of the nutrition support (6).

 Soo and Gramlich created a study focused on advanced cancer patients receiving home TPN, in order to lessen the controversy over whether TPN should be used in terminally ill patients (7). They confirmed the benefits of nutrition when it was found that the 52% of cancer patients who were malnourished had significantly lower physical and functional quality of life scores compared to the well-nourished patients. The study ran from 1999 to 2006, 38 patients receiving home TPN were followed. How long the patients survived greatly depended on their functional status. Therefore, it was theorized that if TPN is initiated prior to a decline in function, the prognosis may improve. Although, TPN has been linked to an elongated survival rate, this study also showed that TPN had no effect on the patient’s quality of life whether it was part of an in-hospital treatment or adjunct medical therapy. Quality of life was measured based on daily activity, pain level, and ability to sustain oral intake. The problem with this measurement is that it fails to take into account a number of other components of quality of life such as anxiety level, energy, and other disease symptoms. Patients have reported in similar studies that TPN provided a sense of anxiety relief for the patient and families as well as improved energy level and strength. However, it is important to note negative aspects of choosing TPN including complications such as PICC line infections and cost (7).

**Initial Assessment 7/10**

Nutrition Assessment

* Screened for SBO
* NGT removed, gastrostomy for suction
* Receiving protonix
* Subclavian central line present
* Patient is unable to eat d/t SBO with no way to bypass
* Weight loss of 14# (9%) in ~3 weeks which is significant
* Hyperglycemia without coverage

Nutrition Diagnosis

* Severe nutritional risk d/t pancreatic cancer, SBO, weight loss, and TPN.
* PES statement 1: Inadequate nutritional intake related to SBO and metastatic cancer as evidenced by weight loss, patient interview, MD report.
* Other optional PES statements:
	+ Abnormal laboratory values r/t GI surgery, inadequate oral intake, metastatic cancer, and stress as evidenced by glucose 152 and albumin 2.4.
	+ Altered GI function related to cancer, Whipple procedure, and SBO as evidenced by exploratory laparotomy and MD report.
	+ Involuntary weight loss related to SBO and resulting inadequate oral intake as evidenced by patient’s report.
	+ Inadequate protein intake r/t SBO as evidenced by total protein 4.5, albumin 2.1, and prealbumin 5.0.

Nutrition Intervention:

* Initiated TPN at 75% of needs. Plans to advance to 100% tomorrow.
* TPN was appropriate d/t inability to use enteral nutrition secondary to SBO.
* TPN initiated to run at 65 ml/hr providing 75% of recommended macronutrients. This initial TPN bag will provide 1238 kcal (24 kcal/kg), 53 g protein (1.0 g/kg), 41 g lipid, 195 g CHO, 5 ml MVI, and 0 ml TE (due to a shortage). The patient is receiving 2400 ml total fluid (1560 ml TPN fluids + 840 ml IV fluids) because MD recommends 100 ml/hr total fluids. No units of insulin provided.
* Standard electrolytes were provided including 80 mEq sodium, 60 mEq potassium, 9.4 mEq calcium, 15 mmol phosphorus, 8 mEq magnesium, and 1/3 to 2/3 chloride to acetate ratio.
* Patient education provided on what TPN is and what to expect.

Nutrition Monitoring and Evaluation

* Laboratory values ordered including CMP and nutrition support panel.
* Follow up next day

**Follow-up (7/11)**

Nutrition Assessment:

* Hypokalemia indicated by K 3.3
* Depleted protein stores indicated by albumin 2.1 and prealbumin 5.0.
* Per MD order, rider provided to improve potassium and magnesium levels and fluids to equal a total of 100 ml/hr.
* Per MD note, TPN expected for 90 days and therefore plans to discharge patient on TPN.

Nutrition Diagnosis:

* Severe nutritional risk
* PES statement 1: Inadequate nutritional intake related to SBO and metastatic cancer as evidenced by weight loss, patient interview, MD report.—completed
* PES statement 2: Abnormal laboratory values r/t GI surgery, inadequate oral intake, metastatic cancer, and stress as evidenced by glucose 181, POC 212-237, K 3.3, albumin 2.1, and prealbumin 5.0.

Nutrition Intervention:

* Increased TPN to provide 100% of nutritional needs.
* Per MD order, total fluid running at 100 ml/hr between the IV and TPN.
* Added 5 units of insulin d/t elevated blood sugars. Began with minimal units d/t limited knowledge on how patient would react to insulin.
* Due to MD’s recommendation to replenish K and Mg levels and laboratory values, increased K by 20 mEq and Magnesium by 4 mEq.
* TPN running at 65 ml/hr providing 100% of recommended macronutrients. This will provide 1650 kcal (32 kcal/kg), 70 g protein (1.4 g/kg), 55 g lipid, 260 g CHO, 5 MVI, and 0 TE (due to a shortage). The patient is receiving 2400 ml total fluid (1560 ml TPN fluids + 840 ml IV fluids) because MD recommends 100 ml/hr total fluids. 5 units insulin provided.
* Standard electrolytes were provided including 80 mEq sodium, 80 mEq potassium, 9.4 mEq calcium, 15 mmol phosphorus, 12 mEq magnesium, and 1/3 to 2/3 chloride to acetate ratio.

Nutrition Monitoring and Evaluation

* Laboratory values ordered including BMP, phos, Mg
* Follow up next day

**Follow-up (7/12)**

Nutrition Assessment:

* IV increased to 60 ml/hr to equal MD order of total fluid at 125 ml/hr
* Insulin aspart (Novolog) started by MD to address elevated glucose levels.
* Per MD note, TPN expected for 90 days and therefore plans to discharge patient on TPN.

Nutrition Diagnosis:

* Severe nutritional risk
* PES statement 1: Inadequate nutritional intake related to SBO and metastatic cancer as evidenced by weight loss, patient interview, MD report.—completed
* PES statement 2: Abnormal laboratory values r/t GI surgery, inadequate oral intake, metastatic cancer, and stress as evidenced by glucose 134 and POC 158-175.—continued.

Nutrition Intervention:

* Continued TPN to provide 100% of nutritional needs with elevated K, Mg and 5 units insulin.
* TPN solution same as yesterday.

Nutrition Monitoring and Evaluation

* Laboratory values ordered including BMP, phosphorus, Mg
* Follow up next day

**Follow-up (7/13)**

Nutrition Assessment:

* Insulin aspart (Novolog) continued by MD to address elevated glucose levels.
* Plans for PICC line insertion.
* Per MD note, TPN expected for 90 days and therefore plans to discharge patient on TPN.

Nutrition Diagnosis:

* Severe nutritional risk
* PES statement 1: Inadequate nutritional intake related to SBO, Whipple procedure, and metastatic cancer as evidenced by weight loss, patient interview, MD report.—completed.
PES statement 2: Abnormal laboratory values r/t GI surgery, inadequate oral intake, metastatic cancer, and stress as evidenced by glucose 112 and POC 146-147.—continued.

Nutrition Intervention:

* Began to cycle TPN in anticipation of home TPN cycles. Schedule to cycle at 90 ml/hr x 1 hour, 155ml/hr x 12 hours, and 90 ml/hr x 1 hour. Discontinue IV fluids.
* TPN will provide 2040 ml fluid, 1650 kcal (32 kcal/kg), 70 g protein (1.4 g/kg), 55 g lipid, 260 g CHO, 5 MVI, and 0 TE (due to a shortage). The patient is receiving 2400 ml total fluid (1560 ml TPN fluids + 840 ml IV fluids) because MD recommends 100 ml/hr total fluids. 5 units insulin provided.
* Standard electrolytes were provided including 80 mEq sodium, 80 mEq potassium, 9.4 mEq calcium, 15 mmol phosphorus, 12 mEq magnesium, and 1/3 to 2/3 chloride to acetate ratio.

Nutrition Monitoring and Evaluation

* Laboratory values ordered including BMP, phosphorus, Mg
* Follow up next day

**Follow-up (7/15)**

Nutrition Assessment:

* Insulin aspart (Novolog) continued by MD to address elevated glucose levels however patient will not be discharged on sliding scale.
* IV fluids discontinued.
* Per MD note, TPN expected for 90 days and therefore plans to discharge patient on TPN.
* Patient and sister instructed on G-tube care. Advocate Home Care will control cycled TPN through PICC line.

Nutrition Diagnosis:

* Severe nutritional risk
* PES statement 1: Inadequate nutritional intake related to SBO, Whipple procedure, and metastatic cancer as evidenced by weight loss, patient interview, MD report.—completed
* PES statement 2: Abnormal laboratory values r/t GI surgery, inadequate oral intake, and stress as evidenced by glucose 160, POC 170 and 123, and phosphorus 4.8.—continued

Nutrition Intervention:

* 12 units of insulin placed in bag to address hyperglycemia.
* Decreased phosphorus to 10 mmol/day.
* Continued TPN to provide 100% of nutritional needs with elevated Mg.
* Continue to cycle TPN in anticipation of home TPN cycles. Schedule to cycle at 90 ml/hr x 1 hour, 155ml/hr x 12 hours, and 90 ml/hr x 1 hour
* TPN will provide 2040 ml fluid, 1650 kcal (32 kcal/kg), 70 g protein (1.4 g/kg), 55 g lipid, 260 g CHO, 5 MVI, and 0 TE (due to a shortage). The patient is receiving 2400 ml total fluid (1560 ml TPN fluids + 840 ml IV fluids) because MD recommends 100 ml/hr total fluids. 5 units insulin provided.
* Standard electrolytes were provided including 80 mEq sodium, 80 mEq potassium, 9.4 mEq calcium, 10 mmol phosphorus, 12 mEq magnesium, and 1/3 to 2/3 chloride to acetate ratio.

Nutrition Monitoring and Evaluation

* Advocate Home Care will cover nutrition care.
* Will be followed by clinical dietitian during stent procedure.

**Conclusion**

Since hospitalization, laboratory values are the main indicator of improvement from the hospital therapy received by the patient. The following has increased since TPN was initiated: potassium, calcium, phosphorus, and magnesium. It is also interesting to note that H/H, RBC, and blood pressure increased as well. Point of care (accuchecks) decreased. Finally, it is noted that BS and flatus improved and a BM occurred on 7/14. Weight remained stable during hospital stay.

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