

***Nutr 341: Medical Nutrition Therapy: A Case Study Approach 3rd ed.
Case 32 – Esophageal Cancer Treated with Surgery and Radiation***

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Instructions: This is not a group case study; it is an individual assignment! Complete the following questions using the background information of Case 32.

Remember RD's are experts in researching evidence-based practice for their patients so you can use other *credible* sources. *Be sure to reference your answers and provide a Work Cited page at the end.*****

III. Nutrition Assessment

A. Evaluation of Weight/Body Composition

8. Calculate and evaluate Mr. Seyer's percent UBW and BMI.

UBW: 230

%UBW: 86% (198/230 x 100 = 86.1%)

BMI: 25

$$198/(75)^2 \times 704$$

$$198/5625 \times 704$$

24.8

Weight Change: 14%

$$230-198/230 = 14\%$$

9. Summarize your findings regarding his weight status. Classify the severity of his weight loss. What factors may have contributed to his weight loss? Explain.

Pt BMI is 24 thus his weight status is within normal range for his height and weight. APt BMI calculation is after a weight loss of 30# thus according to his UBW his BMI is 29 placing him in the overweight category. Pt is only 86% of his UBW and has had a weight change of 14%. Weight loss prevention is key in order to prevent mal-absorption. According to pt's physical exam he has had some muscle wasting which is most likely due to his recent weight loss.

A factor that may have contributed the pt's recent 30# weight loss is reducing his intake due to the pain of eating especially eating anything with texture. Pt has reported difficulty swallowing (dysphagia), heartburn and early satiety as well.

B. Calculation of Nutrient Requirements

12. Estimate Mr. Seyer's energy and protein requirements based on his current weight. Identify the factors you used in determining which equations to use for these calculations.

*****Energy Requirements:**

$$32 \text{ kcal}/90\text{kg}$$

$$= 2880 \text{ kcal}/\text{day}$$

-I chose the 32 kcal/kg to estimate the energy requirements of the pt due to the fact that he has had a 30# weight loss, is 86% of his UBW and has had a 14% weight change. His physical report shows muscle wasting thus

giving me reason to conclude the patient is in a slightly hyper metabolic state.

Protein Requirements:

$$\begin{aligned} &1.4\text{g/kg} \\ &1.4\text{g}/90\text{kg} \\ &= \underline{126\text{g/day}} \end{aligned}$$

-I chose 1.4g of PRO a day due to the fact that he has a 14% weight loss and has shown signs of muscle wasting. Pt needs an increase in daily protein to sustain and prevent muscle wasting.

13. Estimate Mr. Seyer's fluid requirements based on his current weight.

Fluid Requirement:

$$\begin{aligned} &30\text{-}35\text{ml/kg} \\ &30\text{-}35 \text{ ml}/90 \text{ kg} \\ &= \underline{2700 \text{ ml -}3150 \text{ ml}} \end{aligned}$$

I chose using 35 ml/kg → 3150 ml because the patient shows signs of dehydration such as dry skin and dry mucous membranes.

C. Intake Domain

14. What factors can you identify from Mr. Seyer's history and physical that may indicate any problems with eating an oral diet prior to admission?

History: Pt. history reports heartburn for a 1yr, difficulty/pain when swallowing (especially textured foods), loss of appetite, early satiety. Pt's onset of disease was noted as dysphagia for 3-4 months and odynophagia for 5-6 months.

Physical: Pt. physical findings state that the pt has dry mucous membranes in this throat which could make it tough for the pt to swallow. Pt also shows signs of epigastric tenderness on palpation.

-All findings above indicate that the pt will have a hard time consuming an oral diet.

15. How are these factors consistent with his diagnosis?

Pt is diagnosed with Stage IIB (T1, N1, M0) adenocarcinoma of the esophagus.

T1- less than 2 cm across

N1- had reached only the lymph nodes in the underarm area

M0- has not spread to distant parts of the body

A major risk factor for esophageal cancer is conditions caused by long-term gastroesophageal reflux (ie. heartburn.) Pt. has reported having consistent heartburn for at least a year thus is consistent with his diagnosis.

Other factors that could be contributing to pt's diagnosis is the daily intake of alcohol and tobacco.

16. Mr. Seyer is currently receiving enteral nutrition therapy. He is prescribed Isosource HN at 75 mL/hr.

a. Calculate the amount of energy and protein that will be provided at this rate.

KCAL:

$$\begin{aligned} &75 \text{ ml} \times 24\text{hr} = 1800 \text{ ml} \\ &1800 \text{ ml} \times 1.2 \text{ kcal/ml} = \underline{2,160 \text{ kcal/day}} \end{aligned}$$

PRO:

$$\begin{aligned} &\text{Formula provides } 18\% \text{ PRO} \\ &1800 \times .18 = 324 \text{ kcal comes from PRO} \\ &324 \text{ kcal} / 4 \text{ kcal/g} = \underline{81 \text{ g/day}} \end{aligned}$$

- b. Next, by assessing the information on the patient care summary sheet, determine the actual amount of enteral nutrition that he received on September 11.**

Pt received a total of 1885 ml on September 11 through formula/flushes. Pt. received 2400 ml of fluid through IV. Pt received a total of 1735 ml on September 11 through formula, only. Therefore, the pt. is receiving 2082 kcal, 78g PRO and 4285 ml of fluid.

- c. Compare this to his estimated nutrient requirements. Identify any nutrition problems.**

According to my calculations, the pt needs approximately 2880 kcal/day, 126g PRO/day, and around 3000ml of fluid. On September 11, the pt only received 2082 kcal and 78.1 g PRO.

Key nutrition problems regarding these facts are clear. The pt is not receiving adequate amounts of daily kcal or protein needs.

- d. Compare fluids required to fluids received. Is he meeting his fluid requirements? How did you determine this? Why would you evaluate his output when assessing his fluid intake?**

The pt's fluid requirements are 3150 ml/day. The patient consumed a total of 4285 ml of fluid through IV, the formula, and flushes. The patient had an output of 4000 ml on September 11 thus the patient has a fluid balance of +285 ml. Therefore, the pt is meeting his fluid requirements.

I evaluated his output when assessing the pt's fluid intake d/t the fact that a patient could be consuming an adequate amount of fluid in a day although excreting an excess amount of fluid placing him in a negative fluid balance. If a patient is in a negative fluid balance their output is greater than their intake thus they are not meeting their fluid requirements in order to be/stay hydrated.

- 17. What type of formula is Isosource HN? One of the residents taking care of Mr. Seyer asks about a formula with a higher concentration of omega-3 fatty acids, antioxidants, arginine, and glutamine that could promote healing after surgery. What does the evidence indicate regarding nutritional needs for cancer patients and, in particular, nutrients to promote postoperative wound healing? What formulas may meet this profile? List them and discuss why you chose them.**

Isosource HN is a high protein and calorie formula (high nitrogen/energy.) According to the evidence-base analysis library there is no significant research implying that omega-3 fatty acids, antioxidants, arginine, and glutamine promote healing after surgery.

Evidence shows that patients with wounds as well as cancer need a higher amount of both calories and protein than individuals not undergoing wound healing and/or is not a cancer patient. Some high calorie and protein formulas include Osmolite 1.5, Jevity 1.5, and TwoCal HN. I chose all three of these formulas because would provide adequate kcal/protein for individuals who require wound healing as well as cancer patients.

- 18. From the information gathered within the intake domain, list possible nutrition problems using the diagnostic term.**

1. Inadequate enteral intake infusion
2. Less than optimal enteral nutrition infusion
3. Inadequate protein intake

D. Clinical Domain

- 19. After reviewing the patient's admission history and physical, discuss any factors noted there that are consistent with decreased oral intake.**

Factors consistent with decreased oral intake are heartburn, pain when swallowing, dysphagia, and odynophagia. Heartburn has made it uncomfortable for the patient to consume foods. Likewise, the pain,

dysphagia, and odynophagia have made it difficult, unpleasant, and painful to swallow foods thus the patient has had a decrease in his oral intake.

The patient has a weight loss of 30#, is 86% of his UBW, has had a 14% weight change, shows signs of muscle wasting, and has a severely insufficient 24-hr recall. Pt appears thin, pale, and his eyes are sunken.

All signs/factors noted above are consistent with decreased oral intake.

20. After reviewing the patient's admission history and physical, are there any clinical signs of malnutrition?

Yes, the patient has a weight loss of 30#, is 86% of his UBW, has had a 14% weight change, and shows signs of muscle wasting.

21. Review the patient's chemistries upon admission. Identify any that are abnormal. Using the following table, describe their clinical significance for this patient.

<i>Chemistry/ Date</i>	<i>Normal Value</i>	<i>Mr. Seyer's Value</i>	<i>Reason for Abnormality</i>	<i>Nutritional Implications</i>
Albumin 9/5, 9/11	3.5-5	3.1 (L) 3.0 (L)	Malnutrition, Inadequate protein intake, dehydration	Increase protein and kcal intake, rehydrate
Total protein 6/5, 9/11	6-8	5.7(L) 5.7 (L)	Malnutrition, Inadequate protein intake	Increase protein and kcal intake
Prealbumin 9/5, 9/11	16-35	15 (L) 12 (L)	Malnutrition, Inadequate protein intake	Increase protein and kcal intake
CPK 9/5	55-170	172 (H)	Muscle dystrophy	Increase protein intake and when appropriate pt should take part in weight bearing exercises
RBC 9/5, 9/11	4.5-6.2	4.2 (L) 4.3 (L)	Poor nutrition/malabsorption, side effect of cancer	Increase iron, B12, and/or folate intake, may need supplementation until pt can move to oral diet
HGB 9/5, 9/11	14-17	13.5 (L) 13.9 (L)	Fewer production/destruction of RBC due to cancer	Increase iron, B12, and/or folate intake, may need supplementation until pt can move to oral diet
HCT 9/5, 9/11	40-54	38 (L) 38 (L)	Low amount of RBC	Increase iron, B12, and/or folate intake, may need supplementation until pt can move to oral diet
MCH 9/5, 9/11	26-32	32.4 (H) 32.3 (H)	Low RBC (macrocytic anemia)	Increase iron, B12, and/or folate intake, may need supplementation until pt can move to oral diet
ESR 9/5	0-15	15 (H)	Little inflammation/infection	Will reduce once adenocarcinoma of the esophagus is cured.
MCHC 9/11	31.5-36	36.5 (H)	Macrocytic anemia	Increase B12, and/or folate intake, may need supplementation until pt can move to oral diet

22. From the information gathered within the clinical domain, list possible nutrition problems using the diagnostic term.

1. Swallowing difficulty
2. Impaired nutrient utilization
3. Unintentional weightloss

4. Altered nutrition-related laboratory values

IV. Nutrition Diagnosis

25. *Select two high-priority nutrition problems and complete the PES statement.*

1. Inadequate enteral nutrition infusion related to an increase in kcal needs as evidence by unintentional weight loss of 14%, dry mucous membranes, loss of muscle mass, EN plan of Isosource HN 1.2 at 75ml/hr x 24 hrs providing less calories and grams of protein than pt's estimated needs, and albumin 3.0 (L), total protein 5.7 (L), prealbumin 12 (L).
2. Altered gastrointestinal function related to dysphagia and odynophagia as evidence by diagnosis of Stage IIB (T1, N1, M0) adenocarcinoma of the esophagus after endoscopy with brushing and biopsy and CT scan, muscle wasting, heartburn, esophageal pain, coughing, malabsorption, 30# unintentional weight loss, 14% weight change, 86% UBW, and RBC 4.3 (L), HGB 13.9 (L), HCT 38 (L), and MCH 32.3 (H).

V. Nutrition Intervention

26. *For each of the PES statements that you have written, establish an ideal goal (based on the signs and symptoms) and an appropriate intervention (based on the etiology) at this point of Mr. Seyer's hospital course.*

1. **Inadequate enteral nutrition infusion →**

Food and/or Nutrient Delivery: Enteral Nutrition

Goal: Provide adequate enteral intake/meet >75% nutrient needs

Intervention: Increase the rate at which the pt is receiving the formula to 100ml/hr x 24 hrs. This will increase both the PRO and kcal the pt will be receiving. -- Increasing the rate the pt receives the formula from 75 ml to 100 ml will bring the pt's intake up to 2880 kcal and his protein intake 108g.

2. **Altered gastrointestinal function →**

Food and/or Nutrient Delivery: Nutrition-Related Medication Management

Goal: Provide adequate minerals to eliminate anemia

Intervention: Supply medications to fix anemia (iron, B12, folate supplements)

27. *Does his current nutrition support meet his estimated nutritional needs? If not, determine the recommended changes. Discuss any areas of deficiency and ideas for implementing a new plan.*

No, his current nutrition support doesn't meet his estimated nutritional needs. The pt's current formula (Isosource HN 1.2 kcal at 75 ml/hr x 24) provides approximately 2160 kcal and 81g PRO. Furthermore, the pt's actual intake of the formula in reference to September 11's patient care summary sheet reports that he is only receiving 2082 kcal and 78.1 g PRO. According to evidence base practice and my calculations the pt needs approximately 2880 kcal and 126 g PRO per day to prevent further weight loss and muscle wasting.

Recommended changes:

1. Use Isosource HN 1.2 kcal at 100 ml/hr x 24 hrs in order to increase his kcal to a total of 2880 kcal/day. This small change allows the enteral nutrition support to provide adequate kcal and a higher amount of protein (108g/day)
2. If applicable and discomfort subsides, pt could take a high-calorie/high-protein nutritional beverage.

28. *How may these interventions (from question 27) change as he progresses postoperatively? Discuss how Mr. Seyer may transition from enteral feeding to an oral diet.*

As the pt progresses and healing starts to occur the patient's kcal and protein needs will decrease therefore the patient would be able to decrease the amount of kcal and protein being provided through enteral nutrition. For instance. The pt may transition from enteral feeding to an oral diet by being placed on a dysphagia diet. The

type of dysphagia diet would be dependent upon the pain and discomfort caused by swallowing. Typically, I would expect the pt would start on a dysphagia type I or II diet. Eventually, once dysphagia has subsided pt will move to dysphagia stage III if necessary or straight to an oral diet.

VI. Nutrition Monitoring and Evaluation

29. *List the factors that you should monitor for Mr. Seyer while he is receiving enteral nutrition therapy. For example, you might indicate that you should “monitor weight weekly.”*

1. **Monitor weight weekly**

Goal: Prevent further weight loss and muscle wasting. Gain 1-2x/week until reaching UBW of 230.

2. **Monitor Albumin, prealbumin, and total protein levels**

Goal: All levels within normal range (Albumin 3.5-5, Total PRO 6-8, Pre-albumin 16-35)

3. **Monitor total amount of formula pt is receiving**

Goal: Pt receives as close to 2400ml of formula as possible throughout each day to ensure adequate protein/kcal intake is being provided.

4. **Monitor RBC, HGB, HCT, MCH, and MCHC levels**

Goal: All levels within normal range (RBC 4.5-6.2, HGB 14-17, HCT 37-47, MCH36-32, MCHC 31.5-36)

30. *Mr. Seyer will receive radiation therapy as an outpatient. Identified potential nutritional complications with radiation therapy. Choose one of the nutritional complications and describe the nutrition intervention that would be appropriate.*

Nutritional complications with radiation therapy include mucositis, xerostomia, and odynophagia.

Additionally, the pt may not be consuming an adequate amount of fluid thus result in severe dehydration and electrolyte imbalance. Esophageal tissue may become irritated and friable resulting in the pt being NPO.

If the pt's esophagus tissue become irritable and friable enough that the pt is NPO after radiation then the pt would have to be placed on nutritional support. Nutrition support for the pt could have a surgically placed tube feed or a tube feed which bypassed the esophagus.

31. *Identify the major assessment indices you would use to monitor his nutritional status once he begins therapy.*

The primary goal of nutrition therapy for cancer patients is to prevent malnutrition. In order to assess nutrition status once a patient begins therapy nutritional intake such as fluid, kcal, and pro should be monitored in order to assure adequate nutrition is being supplied. Additionally, lab values such as serum albumin, pre-albumin, and total protein should be monitored to assure the patient has limited amount of muscle wasting. Lab values such as RBC, HGB, HCT, MCH, and MCHC should also be monitored to prevent and monitor anemia. A patient's weight should be monitored to assure the patient has minimal amounts of weight loss.

References:

Nelms, M., Sucher, K., Long S. (2010) Nutrition Therapy and Pathophysiology. 2nd edition. Thomson Brooks/Cole, Belmont, Ca.

Evidence-base Analysis Library