

**Final Major Case Study: Renal Disease**

60 points

**PART I: Medical Management of Renal Insufficiency**

Mrs. L. is a 66 yo retired elementary school teacher in a rural community. She is active in outdoor gardening and social clubs, but has been feeling like her health has begun to limit her lifestyle. She has a previous history of **renal insufficiency**. She was recently seen by her personal physician who has referred her to the renal clinic. You are the RDN at the outpatient renal clinic and have been consulted for a nutrition referral and patient counseling.

**Present Illness:** She c/o increasing frequency of headaches, nausea and vomiting, severe itching, an unpleasant taste in her mouth, muscle cramps and twitching, weight loss, weakness, and drowsiness with difficulty concentrating.

**Past Medical History:** Streptococcal infection of throat at age 11, followed by **glomerulonephritis; nephrotic syndrome and renal insufficiency** Dx at age 50y; progressive CKD over past 15 y

**Social History:** Married, Retired 2<sup>nd</sup> grade teacher, 2 adult children, 3 grandchildren

**Physical Examination:**

*General appearance:* white female who appears her age; lethargic, thin

*Vitals:* 5'7" 56.6 kg (UBW 61 kg) 2 yrs ago; medium frame. BP 155/98, right arm, sitting. HR 76 bpm, regular. RR 17 bpm. T 99.0°F.

*Heart:* S4, S1 and S2 regular rate and rhythm: heart without murmur or gallop.

*HEENT:* non contributory

*Neurologic:* oriented to person, place and time

*Extremities:* muscle weakness, 3+ pedal edema.

*Skin:* dry, warm, irritated and red in areas

*Chest/Lungs:* generalized rhonchi with rales that are mild at bases

*Peripheral vascular:* normal pulse (3+) bilaterally

*Abdomen:* bowel sounds positive, soft; generalized mild tenderness; no rebound

*Urinary:* Urine volume =500 mL/24 h; proteinuria negative

**Nutrition History:**

*General:* Intake has been poor due to **anorexia**. Patient states that she tried to follow the diet that she was taught a few years back. "It went pretty well for a while but it was hard to keep up."

*Diet Recall* (doesn't finish it all)

*Breakfast:* 1 c oatmeal, ¼ c milk, ½ banana

*Lunch:* chicken noodle soup, coke

*Dinner:* meat, potato and green beans

*Snacks:* yogurt

*Food allergies/intolerances/aversions:* none

*Previous MNT:* 2-3 gm sodium diet 6 years ago

*Food purchase/preparation:* mostly husband

### Vitamin and mineral intake: One-a-Day

Interpret the following laboratory values, using the indices for CKD in the PG. (8 points)

#### Laboratory Results

Lab Parameter	Patient Value	Interpretation (↑, ↓ or wnl)
GFR	20 ml/min	Low
BUN	90 mg/dl	High
Serum Creatinine	4.35 mg/dl	High
Creatinine Clearance	17 ml/min	High
Serum Sodium	150 mEq/L	WNL, but high end
Serum Potassium	5.7 mEq/L	High
Serum Albumin	2.8 g/dl	Low
Hgb	11.5 g/dl	Low
Hct	28%	Low
Serum Transferrin	155 mg/dl	Low
Serum Phosphorus	5.2 mg/dl	High
PTH	100 pg/ml	High
Serum Alkaline Phosphatase	180 units/L	High
Blood Co2	14.8 mEq/L	Low
Your assessment of CKD Stage		Stage 4

#### Physician's Dx and Orders:

**Impression:** Chronic renal failure in a 66 yo underweight female with history of renal insufficiency and nephrotic syndrome. EDW = 52 kg

**Plan:** Nutrition referral for diet counseling; protein restriction; Na 1.5 g; K 2.5 g; Phos 1 g; fluids output + 500 mL

**Rx:** Furosemide (Lasix) 60 mg TID; Losartan (Cozaar) 50 mg BID; sodium bicarbonate 1 g TID  
RTC in 2 weeks with completed lab tests

2. Explain the purpose of each of the following interventions, *and* list the data (laboratory parameters, symptoms, etc.) indicating the need for treatment. (10 pts)

a. Losartan

Purpose: Losartan is used to treat high blood pressure. It acts by being antagonistic to angiotensin II, preventing blood vessels from narrowing, improving blood flow.  
- Blood pressure of 155/98, indicating hypertension.

b. Protein restriction

Purpose: As the functions of the kidneys deteriorate, its ability to excrete metabolic wastes deteriorates as well. Mrs. L's GFR is less than 25, meaning she has stage 4 CKD. Thus, restricting protein intake will slow down the renal disease progression.

Data:

- GFR < 25, and BUN is 90 mg/dL. Indicates necessary protein restriction.  
- NTP, page 534

c. Phosphorus restriction

Purpose: Deteriorating kidneys cannot excrete phosphorus efficiently. This can lead to high serum phosphorus levels, which is associated with increased mortality and myocardial infarction risks.

Data:

- High serum phosphatase levels, at 5.2 mg/dL.
- Low GFR at 20, indicating deteriorating kidneys and CKD.
- NTP 541

d. Potassium restriction

Purpose: Deteriorating kidneys can't excrete enough potassium out of the system. In this case, potassium starts to accumulate, leading to hyperkalemia. This may have potential to lead to heart arrhythmia, GI bleeding, acidosis, and hyper-aldosteronism. Potassium will need to be restricted due to her high potassium levels.

Data:

- Serum potassium level is too high, at 5.7 mEq/L, indicating hyperkalemia.
- NTP 539

e. Fluid restriction

Purpose: As kidney functions deteriorate, fluid excretion ability deteriorates as well. Thus fluids must be restricted to prevent hypotension and changes in blood volume. If fluid is not restricted, it may lead an increase in blood volume, which would be detrimental to the patient.

Data:

- +3 pitting edema
- GFR of 20, indicating stage 4 CKD □ decreased kidney functions
- Blood pressure 155/98, indicating hypertension.

3. The patient asks about using a salt substitute. Is this appropriate, and explain why or why not? (2 pts)

Salt substitutes are concentrated sources of potassium. This is not ok for her to use because potassium needs to be restricted, as stated in the previous question. Her kidneys are deteriorating, and can't excrete enough potassium out of her body. Not only that, but her serum potassium is high, at 5.7 mEq/L, indicating hyperkalemia. Thus, it is important that potassium must be restricted.

4. Evaluate the patient's diet recall for appropriateness in light of the new diet order. Assume that this is a typical food pattern with usual type of food choices. Complete the information below and indicate whether each food item is OK, or list a suggested substitute to help the patient meet the diet guidelines. (9 points)

		<b>OK</b>	<b>Suggested Substitute</b>
<i>Breakfast:</i>	1 c oatmeal	OK	Oat bran, or Ralston Oatmeal.
	¼ c milk	Not OK	Milk, non fat or low fat.
	½ banana	Not OK	Medium sized apple.
<i>Lunch:</i>	chicken noodle soup	Not OK	Self-cooked chicken with no salt added.
	Coke	Not OK	
<i>Dinner:</i>	meat	OK as long as NOT processed or red meat.	Fish
	Potato	Not OK	Bagel
	green beans	OK	
<i>Snacks:</i>	yogurt	OK if plain yogurt.	

5. Based on all of the pertinent information above, write your nutrition assessment ADIME note including PES statement. (16 points)

**A:** Mrs. L is thin white 66 yo retired female, appearing her age with glomerulonephritis. Nephrotic syndrome, and renal insufficiency Dx at age 50yo. Referred to renal clinic by her personal physician. Currently complains of headaches, nausea, vomiting, severe itching, unpleasant taste in her mouth, muscle cramps, twitching, wt loss, weakness, and drowsiness w/ difficulty concentrating.

**Diet Rx:** Was prescribed low Na diet from last MNT. Poor intake due to anorexia. Pt tried following diet she was taught, but couldn't keep up. Food prepared by husband.

No allergies, takes one-a-day supplements.

**Anthropometrics:**

ht: 170.18 cm,

CBW: 56.6 kg

UBW: 61kg (2 years ago)

IBW: 62.6 kg

%IBW: 91.88%

BMI: 19.58, within normal limits

**Weight hx:** Weight was 61kg two years ago. Wt loss down to 56.6 kg, due to anorexia.

**Overall appearance:** appears her age, thin, lethargic.

**GI:** Nausea, vomiting, unpleasant tastes in mouth

**Cognition:** Drowsy, difficulty concentrating.

**Skin:** dry, warm, red in places, irritated.

**Biochemical Labs:**

Lab Parameter	Patient Value	Interpretation (↑, ↓ or wnl)
GFR	20 ml/min	Low
BUN	90 mg/dl	High

Serum Creatinine	4.35 mg/dl	High
Creatinine Clearance	17 ml/min	High
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Serum Alkaline Phosphatase	180 units/L	High
Blood Co2	14.8 mEq/L	Low
Your assessment of CKD Stage		Stage 4

**Medication:** Furosemide (Lasix) 60 mg TID; Losartan (Cozaar) 50 mg BID; sodium bicarbonate 1g TID

RTC in 2 weeks with completed lab tests

**Energy:**

TDEE: using NFK K/DOQI recommendations from Dr. Friedman's renal disease lecture slide 23.

Need to get her back to IBW because she is anorexic.

30 – 35 kcal / kg for >65 yo

30 x 61.6 kg (IBW) = 1848 kcal

35 x 61.6 kg = 2156 kcal

1848 – **2156** kcal / day

**Protein:**

0.6 – 0.8 g/kg for stage 4 (Dr. Friedman's lecture, slide 13)

0.6 x 61.6 kg = 36.96 g pro

0.8 x 61.6 kg = 49.28 g pro

37 – **50** g pro / day

**Fluid:** Fluid restriction required.

1000 ml / day

**Food and nutrition hx:**

Intake has been poor d/t anorexia. Was restricted to **2-3 g Na diet** during last MNT. Couldn't keep up with the diet. Has 24 hr recall, but doesn't finish all the food.

Nutrients of concern: Potassium, phosphorus, sodium, fluids, and protein restrictions.

**Dietary breakdown for 24 hr recall:**

		<b>OK</b>	<b>Suggested Substitute</b>
<i>Breakfast:</i>	1 c oatmeal	OK	Oat bran or Ralston Oatmeal.
	¼ c milk	Not OK	Milk, non fat or low fat.
	½ banana	Not OK	Medium sized apple.
<i>Lunch:</i>	chicken noodle soup	Not OK	Self-cooked chicken with no salt added.
	Coke	Not OK	Mineral Water
<i>Dinner:</i>	meat	OK as long as NOT processed or red meat.	Fish
	Potato	Not OK	Bagel
	green beans	OK	
<i>Snacks:</i>	yogurt	OK if plain yogurt.	

Takes one-a-day supplements  
No allergies

## D:

Excessive sodium intake (NI-5.10.1) r/t lack of nutrition education and adherence to last MNT plan, AEB 24 hour recall.

Inadequate energy intake (NI-1.2) r/t nausea, vomiting, and unpleasant taste in mouth after eating food, AEB patient report.

## I:

MNT Goals:

1. Provide nutrition education to manage sodium, potassium, phosphorus, and fluid levels to prevent further progression of CKD.
2. To prevent any further weight loss and achieve ideal body weight through consumption of tolerable foods.

### Recommendation

Need to follow MNT diet plan of 2-3g sodium restriction, as well as bringing potassium and phosphorus levels back down to normal.

- Phosphorus 700 mg/ day
- Fluid restricted to 1000 ml / day

Consume adequate protein to maintain muscle mass and serum protein.

- Protein 37 – 50 g pro / day

Normalize blood lipids.

Give “renal disease food exchange list” handout.

SMART goals:

1. Follow renal diet plan 4 times a week with weekly check ups until patient can follow it full time on her own in a month.
2. For three weeks, slowly increase the amount of tolerable meals Mrs. L has each day by adding one extra meal a week, until she can have eight small meals in a day.

## M + E:

1. Daily food records to keep track of potassium, phosphorus, sodium, protein, and fluid levels.
2. Weekly in-person checkups for three months, and then bimonthly check ups for the next three months.
3. Measure weight weekly to ensure proper weight gain until back to ideal body weight.

Wesley Lu  
3/17/2017  
Nutrition student

### PART II: Dialysis

Mrs. L. has returned to clinic for a 6 month follow up appointment. She is no longer able to keep up her ADL and has had continued poor intake. Her GFR is now 16 mL/min. Her Nephrologist

recommends a transplant, but a kidney is not immediately available. As a consequence, RRT is recommended. Patient and medical team decide on PD.

A peritoneal catheter is surgically inserted. Two months later, her serum potassium level has risen further and BUN is 110 mg/dL. Her BP has also risen. Her pre-CAPD weight is 56 kg at this time, and her EDW is considered to be 50 kg. She is started on CAPD 7 days a week.

Her diet prescription now reads: Na 2.5 g; K 3.5 g; phosphorus 1.2 g. She is given prescriptions for a phosphate binder, and a vitamin supplement that does not contain vitamin A. She will receive EPO and Fe.

6. How much protein and calories per day would you recommend for Mrs. L. and why? (refer to lecture) (4 pts)

Adjusted body weight:  $50 + ((56-50) \times 0.25) = 51.5 \text{ kg}$

Protein: 1.2 – 1.3 g / kg

61.8 – 67.0 g pro / day

Kcals:  $51.5 \times 35 = 1802.5$

1802.5 kcal / day

Reason: Mrs. L has PEM before dialysis began, which means she has higher morbidity and mortality. Thus this is taken into account for how much protein and calories she must have each day.

7. The CAPD prescription is Three 2 L exchanges of 2.5% dextrose each day. Calculate what this will contribute to her caloric intake. (2 pts)

How many grams of dextrose does this supply? 150 g dextrose\_

What does this provide as absorbed calories? \_\_\_\_\_306 kcal \_\_\_\_\_

8. Explain the rationale for the following interventions: (3 pts)

a) Phosphate binder

Used to prevent the gastrointestinal tracts from absorbing dietary phosphorus.

b) Iron and EPO

Blood loss occurs during dialysis. Thus, EPO must be given intravenously stimulate the production of red blood cells. There is also an increase demand for iron due to the production of more red blood cells, so iron supplements must be given.

c) Vitamin supplement containing only water soluble vitamins

Supplementation for water-soluble vitamins must be provided because a lot of it is lost due to the Mrs. L's dialysis, anorexia, and poor dietary intake. Dialysis doesn't take away vitamin A, thus it does not need to be supplemented. However, vitamin B and C must be given.

9. If Mrs. L were to choose Hemodialysis, instead of PD, how would your nutrition recommendations change? List 3 nutrition items, state how your recommendations would change and provide the rationale for each. (6 pts)

1. Protein requirement would change to just 1.2 g/kg/day. This is because more protein is lost during peritoneal dialysis, as opposed to hemodialysis.
2. Calorie range would change to 30 – 35 kcal / kg
3. Vitamin D supplementation to suppress PTH production.