

2006 Calculations TPN Exam

Name: _____

A 70yo, 76 lb lb, 5' 1" female is admitted with confusion and possible infection (blood culture positive for Klebsiella and urine culture positive for E. coli; she is afebrile), acute obstipation and atonic colon. She will receive TPN. Labs are:

sodium	129 mEq/L	normal range 135 – 150 mEq/L
potassium	4.2 mEq/L	normal range 3.5 – 5.0 mEq/L
chloride	99 mEq/L	normal range 100 – 106 mEq/L
bicarbonate	25 mEq/L	normal range 24 – 30 mEq/L
BUN	8 mg/dL	normal range 8 – 20 mg/dL
creatinine	0.5 mg/dL	normal range 0.6 – 1.2 mg/dL
glucose	91 mg/dL	normal range 70 – 110 mg/dL, fasting
calcium	8.2 mEq/L	normal range 8.5 – 10 mEq/L
phosphate	3.6 mg/dL	normal range 2.6 – 4.5 mg/dL
magnesium	1.8 mEq/L	normal range 1.8 – 2.5 mEq/L
albumin	2.5 g/dL	normal range 3.5 – 5 g/dL
cholesterol	170 mg/dL	normal range < 200 mg/dL
triglycerides	106 mg/dL	desired range < 200 mg/dL

Calculate her nutritional needs. Your pharmacy has a pump to which are attached the stock solutions: 10% amino acids, 70% dextrose, 20% intravenous fat emulsion, and sterile water for injection.

Analysis of patient situation:

- This patient is frail and notably underweight. Because of her frailty, we don't want to dose her at IBW, but with her underweight situation, dosing her at ABW won't help her nutritional situation. Choose a number for feed weight that is about halfway between IBW and ABW.
- She is hospitalized and malnourished (note low albumin). Although she is afebrile, her acute confusion and positive cultures mean she may have an infection, which will increase physiologic stress. A protein requirement of 1.2 g/kg/day would be adequate. Use a stress adjustment of 1.3 for her non-protein calories, which should be about right for a possible but not confirmed infection. She is confined to bed at this time, so use the corresponding activity factor.
- Her creatinine clearance is probably lower than the serum creatinine of 0.5 mg/dL would suggest. She likely has stage 3 kidney disease. She doesn't need to be fluid-restricted, but it will be important to not volume overload her either. Choose a volume that is in the middle of her calculated needs range.
- You correct her calcium for her low albumin and find a Ca_{corr} of 9.4 mEq/L. No need to give her a calcium amount at the extreme ends of the range. Ditto for the phosphorus.
- Her sodium is low, so you may want to choose a number in the higher end of the recommended range. She is not acidotic so it will be fine to give her all of her sodium as the chloride salt. Use the recommended amount of potassium.
- Her triglycerides are normal, so no need to restrict fat amount.

Use the TPN worksheet on the following page to determine what will go into her TPN. Please **show your work** in order to get full credit. You may use the back side of this page or the TPN worksheet if you need more room to show how you derived your answers.

Name: _____
TPN Worksheet for pump age: _____ sex: _____

height: _____ cm ABW: _____ kg IBW: _____ kg feed weight: _____ kg

Targets:

1. Daily fluid needs.

>20 kg: 1500mL + (20 mL)(W - 20 kg), or calculated target: _____ mL/day
 30 - 35 mL/kg/day

2. Protein requirements.

normal, unstressed individual: 0.8g/kg/day calculated target: _____ g protein/day
 hospitalized patient: 1-1.2g/kg/day
 stressed patient: 1.5-2g/kg/day

3. Non-protein calories

$BEE_{men} = 66.67 + 13.75(W) + 5.0(H) - 6.76(A)$ calculated target: _____ kcals/day
 $BEE_{women} = 665.1 + 9.56(W) + 1.86(H) - 4.68(A)$
 activity factors: confined to bed: 1.2, out of bed: 1.3
 stress factors: surgery: 1.2; infection: 1.4; trauma: 1.5; burns: 1.7
 TDE = (BEE) (activity factor) (stress factor)

Amounts:

4. Total TPN volume _____ mL

5. Protein Volume

10% AA calculated volume: _____ mL

6. Dextrose volume (3.4 kcals/g) 4 mg/kg/min = _____ g/day

D70W calculated volume: _____ mL

7. Fat volume (9 kcals/g; 2 kcals/mL)

20% lipid calculated volume: _____ mL plus sterile water volume: _____ mL

Electrolytes:

8. Daily electrolyte needs total kcals/day from fat and dextrose: _____ (____ % fat)

	<u>amt/1000 calories</u>	<u>(amt)(# daily cals)/1000</u>	<u>amount/bag</u>
sodium	40-50 mEq	_____	_____
potassium	40mEq	_____	_____
magnesium	8-12mEq	_____	_____
calcium	2-5 mEq	_____	_____
phosphate	15-25mmol	_____	_____

9. Calculate the volume of each electrolyte solution that you will add

	<u>volume to add</u>
sodium chloride 23.4% (4mEq/mL)	_____ mL
sodium acetate 16.4% (2mEq/mL)	_____ mL
potassium phosphate: 3mmol phosphate/mL, 4.4 mEq potassium/mL	_____ mL
potassium chloride 2mEq/mL	_____ mL
magnesium sulfate 4mEq/mL	_____ mL
calcium gluconate 10% (0.465mEq/mL)	_____ mL
vitamins, etc	20.0 mL
total:	_____ mL

infusion rate: _____ mL/hr