### TPN practice questions

1. A 42yo, 148 lb, 5’ 6.5” female is admitted with nausea, vomiting, dehydration, and inability to eat secondary to chemotherapy for breast cancer. She is to be placed on TPN. Labs are:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Normal Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>sodium</td>
<td>133 mEq/L</td>
<td>normal range 135 – 150 mEq/L</td>
</tr>
<tr>
<td>potassium</td>
<td>3.8 mEq/L</td>
<td>normal range 3.5 – 5.0 mEq/L</td>
</tr>
<tr>
<td>chloride</td>
<td>99 mEq/L</td>
<td>normal range 100 – 106 mEq/L</td>
</tr>
<tr>
<td>bicarbonate</td>
<td>32 mEq/L</td>
<td>normal range 24 – 30 mEq/L</td>
</tr>
<tr>
<td>BUN</td>
<td>4 mg/dL</td>
<td>normal range 8 – 20 mg/dL</td>
</tr>
<tr>
<td>creatinine</td>
<td>0.5 mg/dL</td>
<td>normal range 0.6 – 1.2 mg/dL</td>
</tr>
<tr>
<td>glucose</td>
<td>113 mg/dL</td>
<td>normal range 70 – 110 mg/dL, fasting</td>
</tr>
<tr>
<td>calcium</td>
<td>7.9 mEq/L</td>
<td>normal range 8.5 – 10 mEq/L</td>
</tr>
<tr>
<td>phosphate</td>
<td>2.5 mg/dL</td>
<td>normal range 2.6 – 4.5 mg/dL</td>
</tr>
<tr>
<td>magnesium</td>
<td>2.0 mEq/L</td>
<td>normal range 1.8 – 2.5 mEq/L</td>
</tr>
<tr>
<td>prealbumin</td>
<td>&lt; 7.0 mg/dL</td>
<td>normal range 16 – 40 mg/dL (acute nutritional status)</td>
</tr>
<tr>
<td>albumin</td>
<td>2.3 g/dL</td>
<td>normal range 3.5 – 5 g/dL (long-term nutritional status)</td>
</tr>
<tr>
<td>triglycerides</td>
<td>111 mg/dL</td>
<td>desired range &lt; 200 mg/dL (if these are high need to limit fat calories)</td>
</tr>
</tbody>
</table>

Calculate her nutritional needs using both the pre-set volume and the pump methods.
TPN Worksheet using pre-set volumes

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/day; volume for each TPN: __________ ml/bag; # bags/day: ______

5. Protein Volume choose one:
   27.5g in 500ml 5.5% AA 42.5g in 500ml 8.5% AA 50g in 500ml 10% AA or
   10% AA calculated volume: __________ ml

6. Dextrose volume (3.4 kcals/g) choose one
   100g in D20W 500ml 250g in D50W 500ml 350g in D70W 500ml or
   D70W calculated volume: __________ ml

7. Fat volume (9 kcals/g) choose one:
   550kcals/500ml 10% lipid 900kcals/500ml of 20% lipid or
   20% lipid calculated volume: __________ ml plus sterile water volume: __________ ml

Electrolytes:
8. Daily electrolyte needs total amount of kcals/day from fat and dextrose: __________

<table>
<thead>
<tr>
<th>electrolyte</th>
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<th>(amt)(# daily cals)/1000</th>
<th>amount/bag</th>
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<td></td>
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</tr>
<tr>
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9. Calculate the volume of each electrolyte solution that you will add
   volume to add

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<tr>
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<tr>
<td>sodium chloride</td>
<td>__________ ml</td>
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<td>sodium acetate</td>
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</tr>
<tr>
<td>potassium phosphate</td>
<td>__________ ml</td>
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<td>__________ ml</td>
</tr>
<tr>
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infusion rate: __________ ml/hr
TPN Worksheet using pump

age: __________  sex: __________

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

Targets:
2. 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<sub>men</sub> = 66.67 + 13.75(W) + 5.0(H) - 6.76(A) calculated target: __________ kcals/day
BEE<sub>women</sub> = 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/day; volume for each TPN: __________ ml/bag; # bags/day: __________

5. Protein Volume choose one:
27.5g in 500ml 5.5% AA 42.5g in 500ml 8.5% AA 50g in 500ml 10% AA or
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6. Dextrose volume (3.4 kcals/g) choose one
100g in D20W 500ml 250g in D50W 500ml 350g in D70W 500ml or
D70W calculated volume: __________ ml

7. Fat volume (9 kcals/g) choose one:
550kcal/500ml 10% lipid 900kcal/ 500ml of 20% lipid or
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Electrolytes:
8. Daily electrolyte needs total amount of kcals/day from fat and dextrose: __________

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</tr>
<tr>
<td>calcium gluconate</td>
<td>__________ ml</td>
</tr>
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</table>

infusion rate: __________ ml/hr
2. A 72yo, 96 lb, 5’ 2” female receives a colon resection after a diagnosis of obstructive colon cancer. She is to be placed on TPN while her bowel heals. Labs are:

- sodium: 132 mEq/L (normal range 135 – 150 mEq/L)
- potassium: 3.2 mEq/L (normal range 3.5 – 5.0 mEq/L)
- chloride: 99 mEq/L (normal range 100 – 106 mEq/L)
- bicarbonate: 29 mEq/L (normal range 24 – 30 mEq/L)
- BUN: 3 mg/dL (normal range 8 – 20 mg/dL)
- creatinine: 0.5 mg/dL (normal range 0.6 – 1.2 mg/dL)
- glucose: 101 mg/dL (normal range 70 – 110 mg/dL, fasting)
- calcium: 7.8 mEq/L (normal range 8.5 – 10 mEq/L)
- phosphate: 3.1 mg/dL (normal range 2.6 – 4.5 mg/dL)
- magnesium: 1.4 mEq/L (normal range 1.8 – 2.5 mEq/L)
- prealbumin: < 7.0 mg/dL (normal range 16 – 40 mg/dL (acute nutritional status))
- albumin: 2.1 g/dL (normal range 3.5 – 5 g/dL (long-term nutritional status))
- triglycerides: 125 mg/dL (desired range < 200 mg/dL (if these are high need to limit fat calories))

Calculate her nutritional needs using both the pre-set volume and the pump methods.
TPN Worksheet using pre-set volumes

age: __________  sex: __________

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

Targets:
3. 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
  BEEm[en] = 66.67 + 13.75(W) + 5.0(H) - 6.76(A) calculated target: __________ kcsals/day
  BEEw[omen] = 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/day; volume for each TPN: __________ ml/bag; # bags/day: ______

5. Protein Volume choose one:
  27.5g in 500ml 5.5% AA  42.5g in 500ml 8.5% AA  50g in 500ml 10% AA or
  10% AA calculated volume: __________ ml

6. Dextrose volume (3.4 kcals/g) choose one
  100g in D20W 500ml  250g in D50W 500ml  350g in D70W 500ml or
  3.5 mg/kg/min = __________ g/day
  D70W calculated volume: __________ ml

7. Fat volume (9 kcals/g) choose one:
  550kcals/500ml 10% lipid  900kcals/ 500ml of 20% lipid or
  20% lipid calculated volume: __________ ml  plus sterile water volume: __________ ml

Electrolytes:
8. Daily electrolyte needs
  total amount of kcals/day from fat and dextrose: __________

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</tr>
<tr>
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</tr>
</tbody>
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infusion rate: __________ ml/hr
TPN Worksheet using pump

age: _______ sex: _______

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

Targets:

4. 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<sub>men</sub> = 66.67 + 13.75(W) + 5.0(H) - 6.76(A) calculated target: ___________ kcals/day

BEE<sub>women</sub> = 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/day; volume for each TPN: __________ ml/bag; # bags/day: ______

5. Protein Volume choose one:

27.5g in 500ml 5.5% AA  42.5g in 500ml  8.5% AA  50g in 500ml  10% AA  or

10% AA calculated volume: __________ ml

6. Dextrose volume (3.4 kcals/g) choose one 3.5 mg/kg/min = __________ g/day

100g in D20W 500ml  250g in D50W 500ml  350g in D70W 500ml or

D70W calculated volume: __________ ml

7. Fat volume (9 kcals/g) choose one:

550kcals/500ml 10% lipid  900kcals/500ml of 20% lipid  or

20% lipid calculated volume: __________ ml plus sterile water volume: __________ ml

Electrolytes:

8. Daily electrolyte needs total amount of kcals/day from fat and dextrose: __________

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<tr>
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<tbody>
<tr>
<td>sodium 40-50 mEq</td>
<td>_______________________</td>
<td>__________</td>
</tr>
<tr>
<td>potassium 40mEq</td>
<td>_______________________</td>
<td>__________</td>
</tr>
<tr>
<td>magnesium 8-12mEq</td>
<td>_______________________</td>
<td>__________</td>
</tr>
<tr>
<td>calcium 2-5 mEq</td>
<td>_______________________</td>
<td>__________</td>
</tr>
<tr>
<td>phosphate 15-25mMol</td>
<td>___________________</td>
<td>__________</td>
</tr>
</tbody>
</table>

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

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

infusion rate: __________ ml/hr
3. A 80yo, 86 lb, 5' 0'' female with pneumonia and dementia is refusing to eat. She is to be placed on TPN while her infection resolves, in the hope that she will begin eating again. Labs are:

- **Sodium**: 135 mEq/L (normal range 135 – 150 mEq/L)
- **Potassium**: 4.4 mEq/L (normal range 3.5 – 5.0 mEq/L)
- **Chloride**: 104 mEq/L (normal range 100 – 106 mEq/L)
- **Bicarbonate**: 26 mEq/L (normal range 24 – 30 mEq/L)
- **BUN**: 26 mg/dL (normal range 8 – 20 mg/dL)
- **Creatinine**: 0.6 mg/dL (normal range 0.6 – 1.2 mg/dL)
- **Glucose**: 123 mg/dL (normal range 70 – 110 mg/dL, fasting)
- **Calcium**: 8.5 mg/dL (normal range 8.5 – 10 mg/dL)
- **Phosphate**: 3.7 mg/dL (normal range 2.6 – 4.5 mg/dL)
- **Magnesium**: 2.1 mEq/L (normal range 1.8 – 2.5 mEq/L)
- **Albumin**: 2.0 g/dL (normal range 3.5 – 5 g/dL (long-term nutritional status))

Calculate her nutritional needs using both the pre-set volume and the pump methods.
TPN Worksheet using pre-set volumes

age: _________ sex: _________

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

Targets:

5. 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/day; volume for each TPN: ___________ ml/bag; # bags/day: ______

5. Protein Volume choose one:
27.5g in 500ml 5.5% AA 42.5g in 500ml 8.5% AA 50g in 500ml 10% AA or
10% AA calculated volume: ___________ ml

6. Dextrose volume (3.4 kcals/g) choose one 3.5 mg/kg/min = ___________ g/day
100g in D20W 500ml 250g in D50W 500ml 350g in D70W 500ml or
D70W calculated volume: ___________ ml

7. Fat volume (9 kcals/g) choose one:
550kcals/500ml 10% lipid 900kcals/ 500ml of 20% lipid or
20% lipid calculated volume: ___________ ml plus sterile water volume: ___________ ml

Electrolytes:

8. Daily electrolyte needs total amount of kcals/day from fat and dextrose: ____________

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

infusion rate: ___________ ml/hr
TPN Worksheet using pump

age: __________ sex: __________

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

Targets:

6. Daily fluid needs.
> 20 kg: 1500ml + (20 ml)(W - 20 kg), or
30 - 35 ml/kg/day
(calculated target: ______________ ml/day)

2. Protein requirements.
normal, unstressed individual: 0.8g/kg/day
hospitalized patient: 1-1.2g/kg/day
stressed patient: 1.5-2g/kg/day
(calculated target: ______________ g protein/day)

3. Non-protein calories

BEEmen = 66.67 + 13.75(W) + 5.0(H) - 6.76(A)
BEEwomen = 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)

calculated target: ______________ kcals/day

Amounts:

4. Total TPN volume: ________ ml/day; volume for each TPN: __________ml/bag; # bags/day: _____

5. Protein Volume: choose one:
27.5g in 500ml 5.5% AA  42.5g in 500ml 8.5% AA  50g in 500ml 10% AA  or

10% AA calculated volume: ______________ ml

6. Dextrose volume: (3.4 kcals/g) choose one
100g in D20W 500ml  250g in D50W 500ml  350g in D70W 500ml  or

D70W calculated volume: ______________ ml

7. Fat volume: (9 kcals/g) choose one
550kcals/500ml 10% lipid  900kcals/ 500ml of 20% lipid  or

20% lipid calculated volume: ______________ ml  plus  sterile water volume: ______________ ml

Electrolytes:

8. Daily electrolyte needs

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<td>16.4% (2mEq/ml) ml</td>
</tr>
<tr>
<td>potassium phosphate</td>
<td>3mMol phosphate/ml, 4.4 mEq potassium/ml ml</td>
</tr>
<tr>
<td>potassium chloride</td>
<td>2mEq/ml ml</td>
</tr>
<tr>
<td>magnesium sulfate</td>
<td>4mEq/ml ml</td>
</tr>
<tr>
<td>calcium gluconate</td>
<td>10% (0.465mEq/ml) ml</td>
</tr>
</tbody>
</table>

infusion rate: __________ ml/hr
4. A 88yo, 154 lb, 5’ 4” female is admitted for intestinal obstruction. She is to be placed on TPN until her gut starts working again. Labs are:

- Sodium 136 mEq/L, normal range 135 – 150 mEq/L
- Potassium 2.9 mEq/L, normal range 3.5 – 5.0 mEq/L
- Chloride 97 mEq/L, normal range 100 – 106 mEq/L
- Bicarbonate 29 mEq/L, normal range 24 – 30 mEq/L
- BUN 70 mg/dL, normal range 8 – 20 mg/dL
- Creatinine 1.7 mg/dL, normal range 0.6 – 1.2 mg/dL
- Glucose 117 mg/dL, normal range 70 – 110 mg/dL, fasting
- Calcium 8.8 mEq/L, normal range 8.5 – 10 mEq/L
- Phosphate 3.8 mg/dL, normal range 2.6 – 4.5 mg/dL
- Magnesium 2.6 mEq/L, normal range 1.8 – 2.5 mEq/L
- Albumin 2.7 g/dL, normal range 3.5 – 5 g/dL (long-term nutritional status)

Calculate her nutritional needs using both the pre-set volume and the pump methods.

A note: the serum creatinine in this patient would normally indicate kidneys that are not working well (calculated creatinine clearance around 20 ml/min) and so volume restriction might normally be considered. However, in patients who are volume depleted (i.e., low blood volume in their vascular system), the BUN and creatinine will both be elevated and the BUN will elevate faster than the creatinine. A BUN:creatinine ratio of greater than 20 is a hallmark of volume depletion. This woman’s BUN:creatinine ratio is 70:1.7 or 41:1 and so she is definitely volume depleted. Once her intravascular volume is restored, her serum creatinine will drop and her kidney function will appear more normal. Bear in mind, however, that kidney function tends to decrease with increasing age, so this 88 year old woman is unlikely to have “normal” kidney function and thus her volume status (weight, urine output, blood pressure, edema, crackles in the lung) will need to be checked carefully every day.
TPN Worksheet using pre-set volumes

age: ________     sex: ________

height: ________cm     ABW: ________kg     IBW: ________kg     feed weight: ________kg

Targets:
7. 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/day; volume for each TPN: ________ ml/bag; # bags/day: ________

5. Protein Volume choose one:
27.5g in 500ml 5.5% AA    42.5g in 500ml 8.5% AA    50g in 500ml 10% AA    or
10% AA calculated volume: ________ ml

6. Dextrose volume (3.4 kcals/g) choose one
100g in D20W 500ml    250g in D50W 500ml    350g in D70W 500ml    or
D70W calculated volume: ________ ml

7. Fat volume (9 kcals/g) choose one:
550kcal/500ml 10% lipid    900kcal/500ml of 20% lipid    or
20% lipid calculated volume: ________ ml    plus    sterile water volume: ________ ml

Electrolytes:
8. Daily electrolyte needs total amount of kcals/day from fat and dextrose: ________

<table>
<thead>
<tr>
<th></th>
<th>amt/1000 calories</th>
<th>(amt) (# daily cals)/1000</th>
<th>amount/bag</th>
</tr>
</thead>
<tbody>
<tr>
<td>sodium</td>
<td>40-50 mEq</td>
<td></td>
<td></td>
</tr>
<tr>
<td>potassium</td>
<td>40mEq</td>
<td></td>
<td></td>
</tr>
<tr>
<td>magnesium</td>
<td>8-12mEq</td>
<td></td>
<td></td>
</tr>
<tr>
<td>calcium</td>
<td>2-5 mEq</td>
<td></td>
<td></td>
</tr>
<tr>
<td>phosphate</td>
<td>15-25mMol</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

infusion rate: ________ ml/hr
TPN Worksheet using the pump

age: __________ sex: __________

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

Targets:
8. 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\textsubscript{men} = 66.67 + 13.75(W) + 5.0(H) - 6.76(A) calculated target: ___________ kcals/day

BEE\textsubscript{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/day; volume for each TPN: ___________ ml/bag; # bags/day: ______

5. Protein Volume choose one:

27.5g in 500ml 5.5% AA 42.5g in 500ml 8.5% AA 50g in 500ml 10% AA or

10% AA calculated volume: ___________ ml

6. Dextrose volume (3.4 kcals/g) choose one 3.5 mg/kg/min = ___________ g/day

100g in D20W 500ml 250g in D50W 500ml 350g in D70W 500ml or

D70W calculated volume: ___________ ml

7. Fat volume (9 kcals/g) choose one:

550kcals/500ml 10% lipid 900kcals/ 500ml of 20% lipid or

20% lipid calculated volume: ___________ ml plus sterile water volume: ___________ ml

Electrolytes:
8. Daily electrolyte needs total amount of kcals/day from fat and dextrose: ___________

<table>
<thead>
<tr>
<th>electrolyte</th>
<th>amt/1000 calories</th>
<th>(amt)(# daily cals)/1000</th>
<th>amount/bag</th>
</tr>
</thead>
<tbody>
<tr>
<td>sodium</td>
<td>40-50 mEq</td>
<td></td>
<td></td>
</tr>
<tr>
<td>potassium</td>
<td>40mEq</td>
<td></td>
<td></td>
</tr>
<tr>
<td>magnesium</td>
<td>8-12mEq</td>
<td></td>
<td></td>
</tr>
<tr>
<td>calcium</td>
<td>2-5 mEq</td>
<td></td>
<td></td>
</tr>
<tr>
<td>phosphate</td>
<td>15-25mMol</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>electrolyte</th>
<th>solution type</th>
<th>volume to add</th>
</tr>
</thead>
<tbody>
<tr>
<td>sodium chloride</td>
<td>23.4% (4mEq/ml)</td>
<td>___________ ml</td>
</tr>
<tr>
<td>sodium acetate</td>
<td>16.4% (2mEq/ml)</td>
<td>___________ ml</td>
</tr>
<tr>
<td>potassium phosphate</td>
<td>3mMol phosphate/ml</td>
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</tr>
<tr>
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</tr>
<tr>
<td>magnesium sulfate</td>
<td>4mEq/ml</td>
<td>___________ ml</td>
</tr>
<tr>
<td>calcium gluconate</td>
<td>10% (0.465mEq/ml)</td>
<td>___________ ml</td>
</tr>
</tbody>
</table>

infusion rate: ___________ ml/hr
5. A 41yo, 134 lb, 5’ 5” female is admitted for surgical removal of a large adrenal tumour. She is to be placed on TPN in anticipation of a prolonged NPO post-operative course. Labs are:

- **sodium**: 139 mEq/L (normal range 135 – 150 mEq/L)
- **potassium**: 3.7 mEq/L (normal range 3.5 – 5.0 mEq/L)
- **chloride**: 102 mEq/L (normal range 100 – 106 mEq/L)
- **bicarbonate**: 28 mEq/L (normal range 24 – 30 mEq/L)
- **BUN**: 12 mg/dL (normal range 8 – 20 mg/dL)
- **creatinine**: 0.6 mg/dL (normal range 0.6 – 1.2 mg/dL)
- **glucose**: 157 mg/dL (normal range 70 – 110 mg/dL, fasting)
- **calcium**: 10.1 mEq/L (normal range 8.5 – 10 mEq/L)
- **phosphate**: 1.6 mg/dL (normal range 2.6 – 4.5 mg/dL)
- **magnesium**: 1.7 mEq/L (normal range 1.8 – 2.5 mEq/L)
- **albumin**: 3.1 g/dL (normal range 3.5 – 5 g/dL (long-term nutritional status))

Calculate her nutritional needs using both the pre-set volume and the pump methods.
TPN Worksheet using pre-set volumes

age: ________ sex: ________

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

Targets:

   >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/day; volume for each TPN: ________ ml/bag;  # bags/day: ________

5. Protein Volume  choose one:
   27.5g in 500ml 5.5% AA  42.5g in 500ml  8.5% AA  50g in 500ml 10% AA or
   10% AA calculated volume: ________ ml

6. Dextrose volume (3.4 kcals/g)  choose one  3.5 mg/kg/min = ________ g/day
   100g in D20W 500ml  250g in D50W 500ml  350g in D70W 500ml or
   D70W calculated volume: ________ ml

7. Fat volume (9 kcals/g)  choose one:
   550kcals/500ml 10% lipid  900kcals/ 500ml of 20% lipid or
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Electrolytes:

8. Daily electrolyte needs
   total amount of kcals/day from fat and dextrose: ________

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<tr>
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9. Calculate the volume of each electrolyte solution that you will add  volume to add
   sodium chloride 23.4% (4mEq/ml)  ________ ml
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   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

infusion rate: ________ ml/hr
TPN Worksheet using the pump

age: __________    sex: __________

height: __________cm    ABW: __________kg    IBW: __________kg    feed weight: __________kg

Targets:
10. Daily fluid needs.
>20 kg: 1500ml + (20 ml)(W - 20 kg), or calculated target: __________ ml/day
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normal, unstressed individual: 0.8g/kg/day calculated target: __________ g protein/day
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BEE_men = 66.67 + 13.75(W) + 5.0(H) - 6.76(A) calculated target: __________ kcas/day
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activity factors: confined to bed: 1.2, out of bed: 1.3
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9. Calculate the volume of each electrolyte solution that you will add volume to add

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<tr>
<th>electrolyte</th>
<th>amount to add</th>
<th>ml</th>
</tr>
</thead>
<tbody>
<tr>
<td>sodium chloride</td>
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infusion rate: __________ ml/hr