COMPLIANCE WITH SPECIALIZED NUTRITION SUPPORT

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Compliance

1  a : the act or process of complying to a desire, demand, proposal, or regimen or to coercion

   Patient compliance in completing the treatment regimens was excellent.

   b : conformity in fulfilling official requirements

   His actions were in compliance with state law.

2  : a disposition to yield to others

3  : the ability of an object to yield elastically when a force is applied : flexibility
Hook-up and Infuse TPN
Try to eat something
Check your blood sugar
Take your meds
THIS IS TOO MUCH
Introduction

- EN/PN regimen is complex and time consuming
  - Requires daily and most often several times a day activities
  - Disease exacerbation and/or complications of nutrition can occur even if 100% compliant
- Nutrition therapy is a Responsibility and can be Stressful
- Compliance with the regimen is important to successful disease and nutrition management
- This presentation will discuss hydration, diet and glucose control as variables that create issues if compliance is poor
Compliance Challenges

- Hydration
- Diet
- Glycemic control
- Medications
Hydration
Water: The most important nutrient

- Water is the body’s most valuable nutrient making up:
  - 50-60% of total body weight
  - 90% of total blood volume
  - 75% of brain volume
Biochemical role of water in your body

- Valuable component of all cells
- Essential for biochemical reactions
- Important for transport of nutrients and cellular messengers
Fluid balance

Water In
- Beverages
- Food
- Metabolism

Water Out
- Feces
- Urine
- Insensible loss
- Sweat

Healthy Adult

Water Intake

Water Out

mL

0 500 1000 1500 2000 2500 3000 3500 4000

mL

0 500 1000 1500 2000 2500 3000
Malabsorption syndromes and Fluid Balance

Oral intake stimulates secretion into GI tract to facilitate digestion that may also be malabsorbed and contribute to negative fluid balance

<table>
<thead>
<tr>
<th>Condition</th>
<th>Oral Intake, ml</th>
<th>GI output, ml</th>
<th>Fluid Balance, ml</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>2400</td>
<td>1800 ml</td>
<td>+ 600</td>
</tr>
<tr>
<td>Malabsorption syndrome</td>
<td>1000</td>
<td>1500</td>
<td>- 500</td>
</tr>
<tr>
<td></td>
<td>1500</td>
<td>2500</td>
<td>- 1000</td>
</tr>
<tr>
<td></td>
<td>2000</td>
<td>3000</td>
<td>- -1500</td>
</tr>
<tr>
<td></td>
<td>2400</td>
<td>4400</td>
<td>- -2000</td>
</tr>
</tbody>
</table>
Dehydration

- Inadequate fluid for optimal body performance

Classification:
- Mild: loss of 3-5% of body weight
- Moderate: loss of 5-9% of body weight
- Severe: loss of > 9% of body weight
Signs and Symptoms of Dehydration

- Thirst
- Dry mouth and mucus membranes
- Lethargy and fatigue
- Muscle weakness
- Dizziness (increased with standing)
- Skin tenting
- Reduced urine output
- Decreased weight
- Delayed capillary refill
Physical signs of dehydration

Skin tenting
Physical signs of dehydration

Slow capillary refill time  dry mucus membrane
You need more than a glass of water
# Electrolyte content in GI Fluid

<table>
<thead>
<tr>
<th>(mEq/L)</th>
<th>Sodium</th>
<th>Potassium</th>
<th>Chloride</th>
<th>Bicarbonate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saliva</td>
<td>10</td>
<td>25</td>
<td>10</td>
<td>30</td>
</tr>
<tr>
<td>Stomach</td>
<td>60-90</td>
<td>10-30</td>
<td>100-130</td>
<td></td>
</tr>
<tr>
<td>Duodenum</td>
<td>140</td>
<td>5</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Mixed gastric aspirate</td>
<td>120</td>
<td>10</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Intestine</td>
<td>140</td>
<td>5</td>
<td>100</td>
<td>30</td>
</tr>
<tr>
<td>Colon</td>
<td>60</td>
<td>30</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>Stool</td>
<td>35</td>
<td>3-12</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Pancreas</td>
<td>140</td>
<td>5</td>
<td>75</td>
<td>115</td>
</tr>
<tr>
<td>Bile</td>
<td>140</td>
<td>5</td>
<td>100</td>
<td>35</td>
</tr>
<tr>
<td>Sweat</td>
<td>30-70</td>
<td>0-5</td>
<td>30-70</td>
<td></td>
</tr>
</tbody>
</table>
Why not just water?

Happy Cell ➔ Add water ➔ Unhappy cell
Factors that Influence Hydration

- Quantity and type of Food
- Gastrointestinal losses
- Weather
- Activity
Tips for Accessing Hydration

- Know your baseline weight
  - Morning weight
  - Bedtime weight

- Weigh yourself before engaging in an activity that you anticipate increased fluid losses
  - Day at the beach
  - Exercise
  - Eating foods that result in large GI output
Hydration During Activity

- Sip oral rehydration solution (ORS) slowly
- Continue your typical hydration strategy during activity
- Be creative in finding ways to hydrate
Now we know how to recognize dehydration and hopefully prevent it, but what if things do not go as planned?
How to rehydrate and when to seek help

- **Mild dehydration:**
  - loss of 3-5% of body weight
  - Thirst
  - Dry mouth and mucus membranes

- **Treatment:**
  - Rehydrate with oral rehydration solution
  - Drink slowly and avoid the temptation to guzzle fluid
  - Rest and stay in a controlled temperature environment
How to rehydrate and when to seek help

- **Moderate dehydration:**
  - loss of 5-9% of body weight
  - Dry mouth and mucus membranes
  - Letheragy and fatigue
  - Dizziness (increased with standing)
  - Reduced urine output

- **Treatment:**
  - Sip ORS unless this makes things worse (increased vomiting or diarrhea)
  - Infuse IV fluids at prescribed bolus rate
  - Rest and stay in a temperature controlled environment
How to rehydrate and when to seek help

- **Severe dehydration:**
  - loss of > 9% of body weight
  - Confusion
  - Extreme muscle weakness
  - Dizziness or fainting
  - Skin tenting
  - Delayed capillary refill
  - Minimal to no urine output

- **Treatment:**
  - Call for help
  - Start IV hydration at prescribed rate
  - Seek medical attention
Now we know how to prevent dehydration and all of the bad things that can happen if we are not compliant, so there should be an issue, RIGHT?

Sometimes life interferes with your good intentions!
Morning Run

- Usual AM weight is ~140 lbs.
- Ran for 90 min and the temperature was 82 degrees.
- Post-run weight was 135 lbs.
- Symptoms:
  - Sweaty
  - Thirsty
  - Tired
Compliant patient next step!

What should she do at this point?

(Small group discussion in afternoon breakout session)
What is the current classification of dehydration?

- What is the percent of weight loss?
  - \[
  \frac{(140 - 135) \times 100}{140} = 3.6\%
  \]

- What is the estimated fluid loss?
  - \[
  5 \text{ lbs} \times \frac{1 \text{ kg}}{2.2 \text{ lbs}} \times \frac{1 \text{ L}}{1 \text{ kg}} = 2.2 \text{ L}
  \]

- What is the appropriate treatment at this time?
  - ORS slowly
  - Consider IV hydration if unable to tolerate

**MILD DEHYDRATION**
Breakfast with friends

- Ordered diet coke and a large breakfast
- Guzzled diet coke and ate
- Vomiting and diarrhea began
- Feeling light headed and dizzy
- Cold and clammy
- Laying on the bathroom floor
What should she do at this point?

(Small group discussion in afternoon breakout session)
What stage of dehydration?

- Symptoms:
  - Previously ~5% weight loss
  - Now increased output
  - Dizziness & confusion

- What do you do?
  - Get help!
  - IV hydration

Moderate leading to Severe Dehydration
If you know what you are suppose to do, why don’t you do it?

What would be an appropriate plan for avoiding having this happen again?

(Small group discussion in afternoon breakout session)
Diet
It’s hard to stick to a special diet

- HPN and HEN consumers are often prescribed a special diet that restricts normal foods
- Compliance is a challenge
- Life is centered around food
Factors associated with dietary compliance

- Hunger vs. cravings
- Eating at home vs. away from home
- Social or peer pressure
I want to eat so bad, I could almost cry
I want to be normal

- Interviews conducted with 24 adults with short bowel syndrome
- Quality of life was evaluated
- Lifestyle was affected by health, stamina, diarrhea, having an ostomy, and infusion schedule
- Strong desire to achieve normalcy in life

I want to eat so bad, I could almost cry!

- Eat or infuse nutrition prior to the party to combat true hunger
- Offer to help with the cooking
- Bring your own “safe” food or drink
I want to eat cake like the other kids, but I don’t want my belly to hurt.
Disclosing food issues can lead to a stigma

- In 2006, Sabrina’s Law mandates disclosure of severe food allergies for school age children
- A 2008 study conducted interviews with 20 children and their parents
- Children were stigmatized as a result of the law
- Conflict between physical safety and social well-being

Dean J. Health Soc Care Community. May 4, 2015 [Epub ahead of print]
I want to eat cake like the other kids, but I don’t want my belly to hurt

- Be prepared – talk to children about what may happen if they eat the cake
- Pack “safe” foods
- Communicate special nutritional needs with someone that is going to be at the party
Some situations are unavoidable

- Business lunch
- Job interview meal
- Conference activities
I will put some food on my plate and move it around a bit and hopefully no one will notice I’m not eating...
Successful employment with disabilities

- Individuals with disabilities face barriers to employment
- Investigators interviewed 41 people competitively employed for at least 5 years and discussed disabilities
- Disclosure and discussion decisions were influenced by the disability
- People with disabilities must work harder than others to get a job

I will put some food on my plate and move it around a bit and hopefully no one will notice I’m not eating…

- Decide how much or little you want to disclose and to whom
- Communicate to someone
- Have a wingman to help take the pressure off
Avoiding conventional eating should not make you avoid friends

- Social withdraw is a typical reaction when working through new eating restrictions
- Avoiding social food interactions may make you feel worse about your situation
If I just hold this coffee cup, maybe no one will notice I’m not drinking.

Liz has been holding that cup, but hasn’t taken a drink yet. I wonder if she is okay?
To tell or not to tell

- Be honest
  - Eliminate assumptions
  - Communicate what makes you comfortable
- True friends will care about your wellbeing and will be supportive and want to help
- Avoid unnecessary drama
It is so nice to enjoy a meal with my family and not be judged for what I do and don’t eat.
It is so nice to enjoy a meal with my family and not be judged for what I do and don’t eat.

- Find friends and family that you can enjoy their company without the worries of food
- Enjoy activities that do not involve eating
- Start incorporating non-food traditions into your holiday and celebratory functions
Tools for enhancing diet compliance

- Track food intake and symptoms
- Be prepared, pack familiar/safe food
- Incorporate non-food events and traditions into your social schedule
We often know that eating will lead to trouble, so why do we do it?

What are some strategies that we can use to enhance our diet compliance?

(Small group discussion in afternoon breakout session)
Glycemic control
### Incidence of Hyperglycemia by PN Dextrose Infusion Rate

<table>
<thead>
<tr>
<th>Infusion rate, mg/kg/min</th>
<th>&lt; 4.0</th>
<th>4.1-5.0</th>
<th>&gt; 5</th>
</tr>
</thead>
<tbody>
<tr>
<td># Hyperglycemic Glucose &gt; 200 mg/dl</td>
<td>0</td>
<td>5</td>
<td>18</td>
</tr>
<tr>
<td>% Incidence of Hyperglycemia</td>
<td>0</td>
<td>11</td>
<td>49</td>
</tr>
<tr>
<td>Glucose, mg/dl mean (range)</td>
<td>146 (102-194)</td>
<td>258 (229-330)</td>
<td>258 (201-285)</td>
</tr>
</tbody>
</table>

Negative Fluid Balance in a Home PN Patient

Resulted in Hyperosmolar, Hyperglycemic, Nonketotic Coma

Figure 1. Total fluid output (---) including losses through the urine and fistula and from emesis versus total fluid intake (--) consisting of TPN solutions and unrestricted oral intake over the 17 days of home TPN therapy.

Why is it important to check glucose?

- Hyperglycemia is a frequent complication of EN and PN patients.
- Extensive evidence from observational studies indicates that the development of hyperglycemia during EN and PN is associated with an increased risk of death and infectious complications.
- Hypoglycemia is also common in patients when off of EN or PN and can have dangerous complications if not given prompt attention.
What should I do if I am hyperglycemic or hypoglycemic?

- Inform your physician or TPN clinician
- Record your blood sugar and the circumstances around the event
- Coordinate a plan for preventing and treating hyperglycemia and hypoglycemia
Medications & Nutrition Schedule
Medication compliance

- Everyone has the best of intentions of doing everything correctly
- Life happens!
  - Meds get missed
  - EN/PN cycle time gets off
  - Hydration is not a priority
Using technology to aid compliance

- Set phone alarms/alerts to remind you to take meds
- Use food tracking apps to organize your dietary intake
- Use health apps to track weight and/or fluid intake
Using technology to aid compliance
What should I do when I am not compliant?

- BE HONEST!
- Tell your HPN/HEN team the truth about your compliance
- If you are not honest, no one can help you find solutions to your problems
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Continue this compliance discussion

- Breakout session 1
- Today 2:45-3:45 PM
- Lansdowne Room