



GI Program

Hydration Hints for the SBS Consumer

Presented by: Maria Karimbakas, RD

Fluid



Water is the single largest component of the body contributing between 50-70% of total body weight.

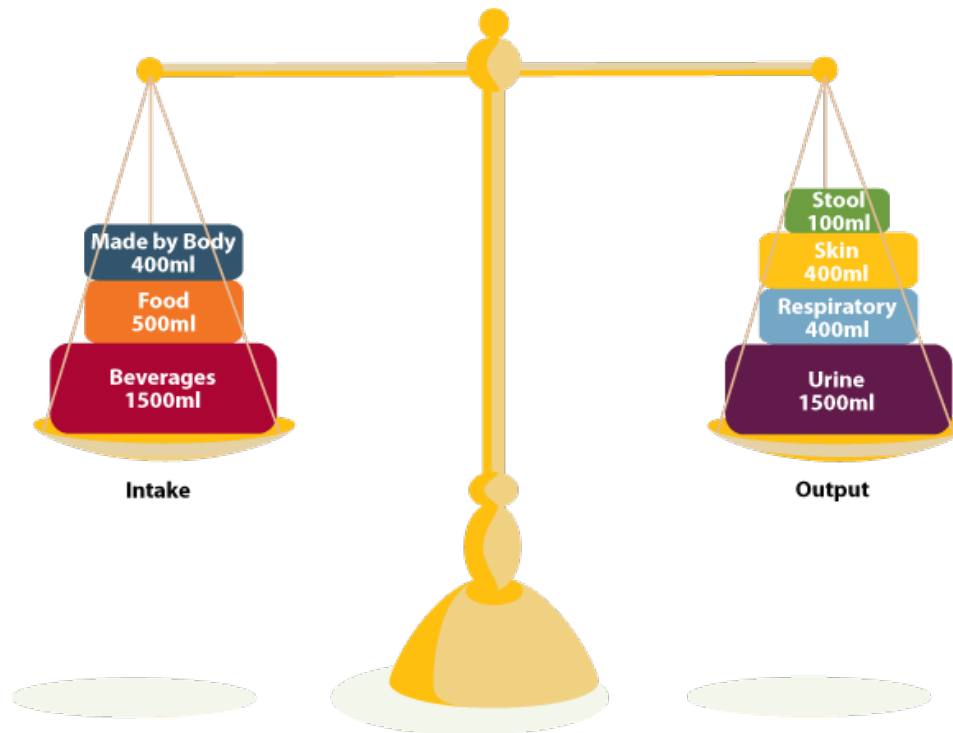
Water is obtained by eating and drinking.

The body also manufactures water.

We lose water in both our urine and stool and through our skin and respiratory tract.

Typically what we take in and what is excreted is equal.

Fluid



Source	Water Intake per ml	Source	Water Output per ml
Water made by the body	400	Stool	100
Water from food	500	Skin	400
Water in beverages	1,500	Respiratory	400
		Urine	1,500
Total	2,400	Total	2,400

Causes of Dehydration



- Diarrhea
- Vomiting
- Increased Perspiration
- Decreased fluid intake
- Fever (water needs increase by 15 % for each one degree rise in body temp)
- Excessive alcohol or caffeine consumption

Signs and Symptoms of Dehydration

- ✓ Increased thirst
- ✓ Dry mouth
- ✓ Sudden weight loss >2# in less than 24 hrs
(Note: 1 L of water weighs 2.2#)
- ✓ Urine output less than minimal requirement according to body size
- ✓ Dark, concentrated urine with a strong odor
- ✓ Weakness, chronic fatigue, low endurance
- ✓ Muscle cramps
- ✓ Cracked lips
- ✓ Postural dizziness
- ✓ Low blood pressure



How to Treat Dehydration

Avoid drinking oral fluids in a rapid manner – Although your body requires more fluid when you are dehydrated and you will feel thirstier, drinking oral fluids quickly will typically worsen circumstances by causing increased stool output.



Consult with your health professional as soon as you have identified the signs and symptoms of dehydration to develop the best treatment plan that may include additional IV or enteral fluid (oral and/or via a feeding tube).



PREVENTION is the best treatment – let's learn how!

Preventing Dehydration

Choose Your Fluid

Choose an appropriate oral fluid tailored to your bowel function and anatomy in order to best manage your fluid balance.

Drink Enough Fluids

Drink an appropriate volume of fluid slowly throughout the day to meet both your baseline needs and to cover your losses.

Supplement Your Fluids

This fluid should be supplemented with sodium, as this electrolyte is eliminated in the largest amount with diarrhea. In addition, sugar should be added to help absorb the sodium.

Fluids Should Be Balanced

Care must be taken that adequate amounts of both sodium and sugar are added, however, it is also important that the fluids do not become overly concentrated in either of these nutrients. To further understand let's talk about osmolarity.

Osmolarity



- Osmolarity is the number of osmoles per liter of solution (the concentration or the number of particles in water.)
- The more particles there are, the higher the osmolarity.
- Note: the normal osmolarity of blood plasma is between 275-295 mOsm/L.

Types of Fluids

Hyper-osmolar

- contain many particles of glucose and little to no sodium – very concentrated
- cause fluid to be pulled into the intestinal tract to dilute the concentration of the drink, therefore causing watery diarrhea
- Examples include: fruit juices, regular soda, lemonade, fruit smoothies

Hypo-osmolar

- contain little to no particles of glucose and sodium – not concentrated
- do not pull fluid into the intestinal tract and are not always absorbed entirely
- also referred to as free fluids
- Examples include: water, ice, decaffeinated coffee and tea, sugar-free soda, sugar free drinks such as Crystal Light, sugar free flavored water

Iso-osmolar (also known as isotonic)

- contain sodium, potassium, and glucose – same concentration as blood and extracellular fluid.
- will not cause fluid to shift into the GI tract therefore, will help to minimize stool output
- Examples include: Oral Rehydration Solution, Cera-Lyte, Pedialyte and Gatorade

Iso-osmolar Drinks

	ORS Salts	Cera-Lyte	Pedialyte	Gatorade***
Manufacturer	Jianas Brothers	Cera Products, Inc.	Ross**	Gatorade
Grams of Carbohydrate/Liter	20	41	25	62.5
mEq of Sodium/Liter	90	70 or 90*	45	20
mEq of Potassium/Liter	20	20	20	3.2
Osmolarity(mOsm/L)	300	220-260	250	330-380
Servings per unit	125 one liter packets per carton	100 one liter packets (50g) per case	8 one liter bottles or 32 eight ounce bottles	6 eight-quart powder canisters
Cost	\$68.75 per carton (\$0.55/Liter)	\$260 per case (2.60/Liter)	\$48.00 (\$6.00/Liter)	\$28.99 per 6 (\$0.63/Liter)
Home Delivery	816-421-2880	888-237-2598 www.ceraproductsinc.com	800-258-7677 www.pedialyte.com	800-88-GATOR www.gatorade.com

*Cera-Lyte also makes Cera-Lyte 50, containing 50 mEq of sodium, however this product is only available in 10 gram size packets to mix into 7 oz of water -- cost of \$6.90 per liter.

** Several other manufacturers (i.e. Walmart, CVS) make generic equivalents to Pedialyte and are sold at a lower cost. These products are ready to drink and do not require mixing.

*** Only a small number of SBS consumers will tolerate Gatorade, mixed according to package instructions. Many more consumers will better tolerate a modified Gatorade recipe.

Speak to Your Health Professional



- Your health professional will be able to guide you in how much fluid you need to take in each day and the exact type of fluid (fluid composition) that is correct for you.
- Your blood work will be analyzed regularly and your fluid output will be monitored carefully so your fluid and electrolyte balance can be maintained as best as possible.
- You will be an important participant in managing your hydration status. You may need to keep a journal of how you feel, how much fluid you lose (i.e. diarrhea) and pay close attention to any signs of dehydration (as outlined above).
- Your health professional will need your help in planning the best possible fluid and electrolyte replacement for you.
- Once the regimen has been established, proceed to the ORS Mixing Instructions beginning on Slide 17.

Questions and More Information

Questions

Please Type your question in to the question bar on the right hand side of your screen. Each question will be answered in the order it was asked.

Coming this summer...

ThriveRx GI Educational Program

- Understand the GI changes in short bowel that require diet modification
- Learn which fluids are best to maintain hydration
- Review the best sources of carbohydrate, protein and fat to improve GI absorption

Go to our website at www.thriverx.net to learn how you can register.

Upcoming Webinars

“Enteral Access: Know Your Tubes and How To Care For Them”

Presented by Jack A. Pasquale, MD Physician Nutrition Specialist
August 2010, TBD. Email abrogan@thriverx.net for more information.



Question & Answer Session

Please note that answers to the following questions have been provided with limited clinical information from the consumer asking the question. Therefore, consumers are reminded to consult with their medical team before any changes to their regimen are made.

Q: What are your thoughts about normal saline given orally versus ORS, as an oral hydration approach?

A: Saline is a sterile solution when given intravenously and it has an osmolarity of 300 mOsm/L. However, it is not typical to give saline orally. The most effective oral rehydration solution contains both sugar and salt and since saline has no sugar, it would seem that it would not be as optimally absorbed by the GI tract. In addition, since most insurance companies do not reimburse for IV solutions given enterally, it might not be the most cost effective decision.

Q: Does adding sodium to a somewhat hyper osmolar drink have the impact of lowering the osmolarity? How would one determine the right amount of sodium to add?

A: No, adding sodium to an already hyperosmolar drink will increase the osmolarity (concentration) further. The best tolerated ORS solution contains 90 mEq of sodium, which is just under 1 tsp of salt (1 tsp of salt contains 100mEq of sodium). The World Health Organization (WHO) home prepared ORS recipe is as follows:

8 tsp of sugar

1 tsp of salt

1 L of water

4 oz of orange juice

Question & Answer Session

- Q:** How much ORS a day is ok? We already use 1 to 1.5 packets a day and he often needs more. For a child that is 13 years old, weighs 50 kilos and gets gtube feeds (no TPN).
- A:** Baseline fluid requirements for a teen are: 40-60 ml/kg. For a 50 kg teen, his baseline needs are 2500 ml. To determine additional fluid requirements, it would be best to measure stool output. At a minimum, he will need another 500 ml per day. Depending on how much formula he gets daily, the remaining volume should come from ORS.
- Q:** How do you calculate oral volume needed? My child has 40 cm of small intestines, no ileum, no ICV and most of colon intact. He is 50 kilos and gets gtube feeds and eats and drinks orally. He has large volumes of loss via stools.
- A:** Baseline fluid requirements are calculated as follows:
Adults: 35 ml/kg
Infants: 100-150 ml/kg
Children: 70-110 ml/kg
Adolescents: 40-60 ml/kg
For a 50 kg teen, his baseline fluid needs are 2500 ml. Additional fluid requirements can be determined by measuring stool output.
- Q:** How long can a serving of ORS be sipped on before throwing it out. For example, we pour out 100 mls of Pedialyte in a cup to be sipped on. And why does Pedialyte need to be thrown out after 48 hours.
- A:** ORS can be sipped on for 24 hours. An open container of Pedialyte needs to be discarded after 48 hours. The reason for these strict parameters is because of the concern for bacteria growth, which can only complicate GI circumstances.

Question & Answer Session

Q: How does the ORS Salts taste? The CeraLyte tastes terrible but our child loves Pedialyte.

A: ORS contains twice as much sodium as Pedialyte so your child may notice the difference. However, for a consumer that is not having their sodium losses replaced intravenously (either in IV hydration or TPN) then the sodium is much needed and the consumer will not be adverse to the taste. Also, the ORS can be flavored with a sugar free powder, like Crystal Light.

Q: What is the best way to measure fluid since it is always a mixture of stool and urine? So you know what volume you should be replacing?

A: Although difficult at times, especially for children, urine should be collected and measured first and then stool. By urinating first, you will avoid mixing of both urine and stool. Your urine volume will tell you how hydrated you are and your stool volume will determine how much daily fluid is needed.

Q: Is urine the number you want to measure for the standard output vs. stool?

A: You will want to measure both urine and stool because urine volume will tell you how hydrated you are and your stool volume will determine how much daily fluid is needed above your baseline needs.

Q: I have a 3 year old who refuses to drink ORS, Pedialyte or anything more flavorful than water. Any recommendations?

A: If there is any flavor he likes at all, I would try to find it in a sugar free powder – like Crystal Light and flavor the ORS. If he won't accept flavoring at all, I would suggest looking at the sodium content of his TPN and/or IV hydration to see if some of the sodium can be reduced. By doing so, you may find your child has more of a taste for sodium – since all of his/her sodium needs are no longer being met. It is also a great time of year to make ORS popsicles!

Question & Answer Session

- Q:** We have been weaning our 3 year old's TPN hours down by half hour increments since the winter. Should stop this process during the hot summer? As you noted, he likes savory rather than sweet flavors. And seems thirsty at night when he's been off his TPN for several hours.
- A:** It makes sense to hold the weaning during the summer months to ensure optimal hydration. To address, his increased thirst after several hours off TPN, it is important that he be sipping on an ORS solution throughout the day to avoid increased thirst, which often leads to increased fluid consumption over a short period of time which can cause increased stool output.
- Q:** My 4 year old son has 100 cm of small bowel, missing his ICV, is on TPN and Enteral Feeds and is having a difficult time with dehydration. He prefers water over any drink. Do you suggest ORS or supplements be administered through g-button?
- A:** Absolutely! Administering ORS via a G-tube is a great way to provide the ORS without having to rely on the child to continuously sip. The more fluid he can take and absorb through the GI tract, the less he will need intravenously.
- Q:** My 15 month old has a G-J Mickey button; he gets small amounts of feeds (5-10ml) via J and drains out of the G. He is on Peptamen Jr. and does use Pedialyte once in awhile but recently he seems to putting more out of his g-tube drainage while on Pedialyte. Would a mix of half Peptamen and half Pedialyte work better while out and about during the summer? I just worry about his drainage causing dehydration. He is on TPN only at night. I did look at the Peptamen Jr. can there is 115mg of sodium in 250 ml.
- A:** For calorie purposes, I think I would leave the formula at full-strength. Pedialyte can be given via the J-tube to provide additional fluid. If he is drinking Pedialyte and having increased g-tube drainage, then I would hold that for now.

Question & Answer Session

- Q:** Is solution measured the same in G-tube infusion as IV infusion? If he gets 684ml of TPN 3 times a week, could we suggest shifting to G-tube infusion? He weighs 31 lbs.
- A:** Yes, G-tube feedings and IV infusions are measured the same. However, since the amount infused via a G-tube is not absorbed in its entirety – when replacing IV fluid with fluid via a G-tube it is necessary to account for these losses. To most accurately assess these losses, it would be necessary to measure stool output for a few days. If measuring is not feasible, then you could estimate losses and simply double his calculated oral fluid requirements to most generously account for the malabsorption.
- Q:** In regards to elevated D - lactic acid levels in pediatric patients. A solution was suggested to us was to use fluids (along with antibiotics) to address. Flush with D5. How does this work and how can we use this kind of solution in a preventative mode vs. after the fact?
- A:** Bacterial fermentation of unabsorbed sugars can cause increased D-lactate production in the colon in some patients. Treatment includes intravenous fluids and administration of antibiotics to reduce colonic bacterial mass. To help prevent D-lactic acidosis, consumers should avoid simple sugars and may also need to decrease their total carbohydrate intake.
- Q:** What is the normal daily intake of oral solutions for a 4 yr old with <20" of small intestine and entire colon (no ICV valve)?
- A:** Baseline fluid requirements are calculated as follows:
Adults: 35 ml/kg
Infants: 100-150 ml/kg
Children: 70-110 ml/kg
Adolescents: 40-60 ml/kg
Additional fluid requirements can be determined by measuring stool output.

Question & Answer Session

Q: When the patient has a 101 degree fever, should they infuse Pedialyte into the G button during the fever?

A: Yes, since water needs increase by 15% for each one degree rise in body temperature, infusing Pedialyte into the G button during the fever will help to meet these higher fluid needs.

Q: Does daily (2x a day) use of Imodium to slow absorption in the GI tract cause more thirst to the body?

A: It would actually work in the reverse. By using Imodium, stool losses should decrease, thereby enhancing absorption of fluid which will help to decrease thirst and dehydration.

Q: If a patient drinks 3 liters of Ceralyte 70 as their only liquid, how much urine output should they expect to see?

A: The amount of urine output will depend on how well the bowel is responding to the oral volume consumed. The lower the stool volume, the higher the urine output. Minimum urine requirements can be calculated as follows:

Child:

1.0-2.0 ml x weight in kg = _____ ml/kg/hour x 24 hours = _____ ml/day

Adult:

0.5-1.0 ml x weight in kg = _____ ml/kg/hour x 24 hours = _____ ml/day

Thank you for joining us