



Dayton Gastroenterology, Inc.

Chronic Diarrhea with an Emphasis on Ostomy Patients

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Colostomy

- surgical operation in which a piece of the colon is diverted to an artificial opening in the abdominal wall so as to bypass a damaged part of the colon

Ileostomy

- a surgical operation in which a piece of the ileum is diverted to an artificial opening in the abdominal wall
- usually necessary when the colon is removed
- ileostomies can cause diarrhea initially, until the ileum adapts to start absorbing water like the colon was supposed to

Gluten, Gluten Everywhere

- 1 in 133 people in the US have Celiac Disease
- 1 in 22 people have Celiac Disease if a 1st degree relative is affected
- Celiac Disease is an autoimmune disorder where ingesting gluten causes damage to the small intestine
 - Damage occurs to the villi, small fingerlike projections in the small intestine, that promote nutrient absorption
 - When villi get damaged, nutrients cannot be absorbed properly
- Non-celiac gluten sensitivity probably exists
- There is no harm in a trial gluten-free diet, similar to a trial of a lactose-free diet

Bile Salt Diarrhea

- **Post-cholecystectomy diarrhea:** after gallbladder is removed, excess bile flows into the colon, creating a laxative effect
- **After resection of ileocecal valve:** acts as a brake for the flow of bile into the colon, allowing it to be absorbed from the terminal ileum
 - when the valve is gone, bile flows into colon, acting as a laxative
- **Treatment:** bile salt binders: cholestyramine, Welchol, Colestid
 - Cholesterol medicines are used, as cholesterol is used in the synthesis of bile acids

Medications

- Many medications can cause diarrhea
 - Metformin is a common culprit
 - 5-ASA agents such as sulfasalazine, Asacol, Lialda, Apriso, Dipentum used to treat IBD can sometimes cause diarrhea
 - PPIs, **BUT** PPIs are also used to reduce stomach acid by 500-1000 cc per day

Medications associated with diarrhea

System targeted by drug	Type of agent	Examples
Cardiovascular	Antiarrhythmics	Digitalis Procainamide Quinidine
	Antihypertensives	ACE-inhibitors Angiotensin II receptor blockers* Beta-blockers Hydralazine Methyldopa
	Cholesterol-lowering agents	Cholestyramine Clofibrate Gemfibrozil Statins
	Diuretics	Acetazolamide Ethacrynic acid Furosemide
Central nervous system	Antianxiety drugs	Alprazolam Meprobamate
	Antiparkinsonian drugs	Levodopa
	Other agents	Anticholinergic agents Fluoxetine Lithium Tacrine
Endocrine	Oral hypoglycemic agents	Metformin
	Thyroid replacement therapy	Synthroid
Gastrointestinal	Antiulcer/antacid drugs	H2-receptor antagonists Magnesium containing antacids Misoprostol Proton pump inhibitors
	Bile acids	Chenodeoxycholic acid Ursodeoxycholic acid
	Laxatives	Cathartics Lactulose Sorbitol
	Treatments for inflammatory bowel disease	5-aminosalicylates (particularly olsalazine)
Musculoskeletal	Gold salts	Auranofin
	Nonsteroidal antiinflammatory drugs	Ibuprofen Mefenamic acid Naproxen Phenylbutazone
	Treatments for gout	Colchicine
Other	Antibiotics•	Amoxicillin Ampicillin Cephalosporins Clindamycin Neomycin Tetracycline
	Antineoplastic agents	Many
	Dietary	Alcohol Sugar substitutes (eg, sorbitol)
	Vitamins	Magnesium Vitamin C

ACE: angiotensin converting enzyme.

* Olmesartan has been associated with sprue-like enteropathy.

• Most antibiotics have been associated with diarrhea.

Data from:

1. Holt PR. Diarrhea and malabsorption in the elderly. *Gastroenterol Clin North Am* 2001; 30:427.
2. Ratnaik RN, Jones TE. Mechanisms of drug-induced diarrhoea in the elderly. *Drugs Aging* 1998; 13:245.

High Output Stoma

- 1.5 - 2 L per 24 hours
- Leads to low magnesium levels
- Leads to sodium & water depletion
- Occurs in 13% - 16% of ileostomies

Dehydration in Ostomy Patients

- It is a misconception that patients with high stomal output can quench their thirst and rehydrate simply by drinking more water or other hypotonic (low amounts of dissolved electrolytes and other substances), such as tea, coffee, or juice

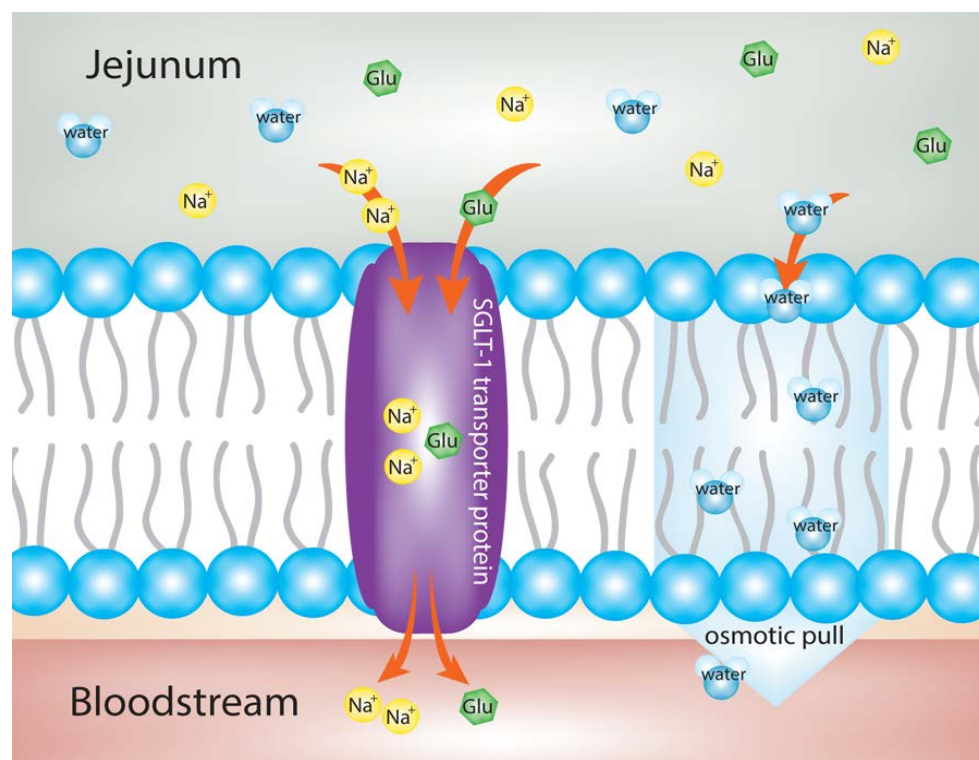
Diarrhea in Ostomy Patients

- Jejunal mucosa is leaky when a solution <90 mM is drunk
- There is a net efflux (flowing out) of sodium from the body into the intestine
- **Water follows sodium**
- The result is INCREASED stomal output and more dehydration!

Water Follows Sodium

- Excess Sodium in the lumen of the intestine causes increased secretion of water out of the body and into the intestine, making diarrhea worse
- This is why you can't drink sea water

Glucose Sodium Co-Transporter to the Rescue



Glucose Sodium Co-Transporter

- If glucose is added to sodium in the right amount, glucose and sodium are absorbed together, and water follows the sodium

Sports Drinks

- Idea is to provide sugar and salt to activate the co-transporter and provide fuel for muscle activity in athletes
- Problem is the balance of sugar to salt is drastically skewed toward sugar
- Simple sugars can increase the amount of water in the bowel
- Oral rehydration solution has **6 teaspoons of sugar** per liter
- Gatorade has **15.2 teaspoons of sugar** per liter

Rehydration Solution

- Many different recipes to improve taste, etc
- The standard recipe is:
 - 6 level teaspoons of sugar
 - 1/2 teaspoon salt
 - 1 liter of water
- Drinking 1 liter a day is like getting a liter of saline IV and will help with dehydration
 - Chill and sip throughout the day, do not drink all at once
- A quick fix is G2 Gatorade plus 1/2 teaspoon of salt added per 32 oz.

Treatment of Severe Dehydration

- NPO for 24 hours
- IV saline to correct dehydration
- Restrict oral hypotonic fluids to <500 cc per day
- Remaining fluid should be glucose/saline rehydration solution
- Loperamide, Lomotil, codeine can reduce weight and sodium content of ileostomy output by 20% - 30%
- Omeprazole (Prilosec) reduces stomach acid by 500-1000 cc per day

Octreotide

- Synthetic chemical that mimics natural occurring somatostatin
- Somatostatin has many effects, but in the case of high output ostomies, it decreases intestinal fluid and motility
- Has to be given by injection
- Very expensive

Lomotil

- A combination of atropine and diphenoxylate
- Atropine blocks the neurotransmitter acetylcholine which is why it is an anti-cholinergic
- Acetylcholine is the main neurotransmitter for the gut
- Blocking this neurotransmitter causes slower movement of intestine and less fluid
- Works outside the gut, also, so it results in trouble with vision, dry mouth, faster heart rate, and decreased sweating
- Diphenoxylate is a centrally acting opioid
- The combination of the anti-cholinergic and opiate slows intestinal contractions, allowing the body to consolidate intestinal contents and prolongs the transit time, allowing intestines to absorb more water
- Also, less water is secreted into the intestines, decreasing output
- Dose needs to be tapered if on Lomotil chronically because narcotic withdrawal symptoms can result

Opioids

- Diphenoxylate (in Lomotil)
- Loperamide (Imodium) - limited effect on the brain, works mostly in the intestine
- Codeine - works very well for diarrhea, but has potential for dependence and abuse

Foods That May Increase Diarrhea

- Alcoholic beverages
- Caffeinated beverages
- Chocolate
- Dried fruit
- Honey
- Jams and jellies
- Juices - apple, grape, prune
- Licorice
- Nuts
- Olives
- Peas, beans, legumes
- Pickles
- Popcorn
- Skins and seeds of fruits & vegetables
- Spicy foods / sauces
- Vegetables - broccoli, cauliflower, onions
- Whole grains

Foods That May Decrease Diarrhea

- Applesauce
- Bananas
- White Bread
- Oat Bran
- Oatmeal
- Pasta
- Smooth peanut butter
- Potatoes
- Pretzels
- Rice Pudding
- White Rice
- Tapioca

Odor Causing Foods

- Cabbage
- Cauliflower
- Asparagus
- Broccoli
- Brussel Sprouts
- Cheese
- Eggs
- Alcohol
- Fish
- Baked Beans

Odor Reducing Foods

- Buttermilk
- Kefir
- Yogurt
- Parsley

Advice for High Output Stoma

- Limit intake of fluids, other than rehydration solution, to <500 cc (2 cups) a day
- Avoids drinks high in sugar
- Avoid artificial sweeteners
- Sip on rehydration solution throughout the day
- Separate fluids from solids during meals
- Take up to 8 Imodium per 24 hours
 - As long as there are no signs of blockage or severe inflammation, such as bleeding or fever

Rehydration Solution Recipe

Ingredients:

- 6 level teaspoons of sugar
- 1/2 teaspoon salt
- 1 liter of water

Directions:

Mix sugar and salt in water.

Chill.

Sip on solution throughout the day. Do not drink entire amount in one sitting.

Drinking 1 liter per day is like getting a liter of saline IV and will help with dehydration.

