

DIET INTERVENTION FOR GASTROPARESIS

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Introduction

Gastroparesis means stomach (gastro) paralysis (paresis). Other terms used to describe this condition are: gastric stasis, gastropathy, slow stomach, sluggish stomach, diabetic enteropathy (in those patients who have diabetes mellitus). Under normal conditions, the stomach is a flexible sac that can stretch and shrink, mix and churn, and eventually empty food into the small intestine. The word gastroparesis is used when a patient's stomach empties too slowly. Everyone's stomach is unique, so the ability of the stomach to empty can vary from one patient to another. Some can still eat small amounts of regular foods; they just have to eat more often to get all their nutrients in. Others may have periods when all they can take in is liquids, and still others may have periods when they cannot take anything at all. Despite this most patients are able to swallow *and empty* their saliva (about 1 quart per day) and also empty the natural stomach juices they make (about 2-3 quarts per day). Symptoms can vary from week-to-week or even day-to-day.

The diet presented here is designed to give tips for diet modification. In addition, lots of suggestions are provided for foods and fluids to try when ideas run dry at home. I want to make it clear that the suggestions are based on my experience and not science, as there are no studies that have been done that demonstrate what foods are better tolerated than others by patients with gastroparesis. Furthermore, any calorie, is a good calorie, especially in someone who has lost a lot of weight and is now facing the possibility of tube or IV feeding to provide nourishment. This may be a time when prior dietary restrictions are put on hold until basic nutritional needs can be met.

It is recommended that anyone with gastroparesis, but especially those with combined medical problems (such as diabetes or kidney disease) seek diet counseling by a registered dietitian to maximize nutritional benefits. To locate a registered dietitian near you, call the American Dietetic Association at 800-366-1655 or visit their website at www.eatright.org.

Essential Nutrients

What your body needs to keep you healthy:

Calories- A calorie is energy provided by food. You need calories (energy) every day for your body to work, just like putting gas in a car. If you need to gain weight, you need more calories. If you need to lose weight, you need fewer calories. Protein, carbohydrate, and fat are all different kinds of calories.

- ◆ **Protein** – To make and repair all tissues; we need some every day. Most people need about 50-60 grams of protein per day to meet all their protein needs.
Examples: meats, fish, poultry, milk, egg (see table 2)
- ◆ **Carbohydrate** (starches and natural sugars) – The energy source and one of the easiest nutrients for our bodies to use. Get some at every meal or snack.
Examples: Toast, crackers, potatoes, rice, pasta
- ◆ **Fat** – Another energy source that also provides essential nutrients to our bodies. Extra fat can help you gain weight because it is the most concentrated source of calories.
Examples: butter, mayonnaise, margarine, vegetable oil

Water or fluids – We all need a certain amount of fluid every day to make sure we are well hydrated. You can get fluid from juice, milk, water, tea, coffee, soda, and other liquids. Even if you are vomiting a lot, you need to somehow take in fluids to stay hydrated. Vomiting may actually get worse, just from being dehydrated.

Vitamins and minerals – Found in all different kinds of foods and beverages and are essential to us all. Vitamins and minerals do not supply energy, so even if you take vitamins, you still need to eat foods for energy. If you have a lot of vomiting and have lost a lot of weight, your doctor or dietitian may recommend that you have certain vitamin or mineral levels checked with a simple blood test. If extra vitamins and/or minerals are needed, you may tolerate chewable or liquid forms better.

Specific Nutrients

Patients who have had a big weight loss are at risk for multiple nutrient deficiencies. During the repletion phase, a standard multiple vitamin and mineral supplement may prove beneficial. However, this should be done under the guidance of a physician and registered dietitian. The most common nutrient deficiencies seen in patients with gastroparesis are iron, vitamin B12 (cyanocobalamin), vitamin D and calcium. (Patients who have gastroparesis from partial stomach removal are at most risk for these types of nutrient deficiencies).

The Basics

Volume

The larger the meal, the slower the stomach emptying will be. Filling up quickly while eating but before nutrient needs are met is a real problem for people who have gastroparesis. Calorie and protein needs, as well as vitamins, minerals and fluid requirements may not be met. So, patients will need to decrease the volume of their meals, but in order to meet nutrient needs, they will have to eat more often. Smaller, more frequent meals (6-8 or more if necessary) may allow patients to meet their needs.

Liquids Versus Solids

If decreasing the meal size and increasing the number of “meals” does not work, the next step is to switch over to more liquid-type calories. Patients with gastroparesis will often tolerate liquids even if solids are not passing well. Liquids empty the stomach in a different way than solids do. Almost all liquids, even those that are high in calories, will empty from the stomach. Puréed foods practically are liquid after mixing with saliva and stomach juices, and may be more easily tolerated than their solid food counterparts. A trial of mostly liquids, followed by the addition of thinned-down puréed foods can be designed to meet nutritional requirements. Patient’s who experience increasing fullness as the day wears on, may want to have their solid food for breakfast, switching to liquid meals as the day progresses.

Fiber

Fiber (found in many fruits, vegetables and grains) may act to slow stomach emptying in some patients and fill them up so quickly that, nutrient needs may not be met. For patients who have had a bezoar (similar to a hair ball in a cat) in the past, a fiber restriction (including avoidance of over-the-counter fiber/bulking laxatives - see table 1) is worthwhile. Patients, who have require jejunal tube feedings generally tolerate fiber-containing formulas as the stomach is bypassed.

Table 1 High Fiber Foods/Medications and Those Associated with Bezoar Formation*

High Fiber Foods
<ul style="list-style-type: none"> ◆ Legumes/Dried Beans Refried beans, baked beans, black-eyed peas, lentils, black, pinto, northern, fava, navy, kidney, and garbanzo beans, soy beans ◆ Bran /Whole Grain Cereals Bran cereals, Grape nuts, shredded wheat type, granolas ◆ Nuts and Seeds Pumpkin seeds, soy nuts, chunky nut butters ◆ Fruits Dried fruits (apricots, dates, figs,* prunes, raisins), blackberries* blueberries* raspberries* strawberries* oranges, apples* kiwi, apples* Coconuts* Persimmons* ◆ Vegetables Green peas, broccoli, Brussels sprouts* Green beans* Corn* Potato peels* Sauerkraut* Tomato skins*
High Fiber Medications/Bulking Agents
<p>Acacia fiber Benefiber Citrucel FiberChoice Fibercon Konsyl Metamucil Perdiem</p>

***Foods Associated with Bezoar Formation**

Fat

Although fat may slow stomach emptying in some patients, many can consume fat especially in the form of liquids. Although many clinicians restrict fat, my experience is that fat in the liquid form (as part of beverages such as whole milk, milkshakes, nutritional supplements, etc.) is often well tolerated. To restrict fat in the diet of a patient who is severely malnourished is to remove a valuable calorie source. Unless a fat-containing food or fluid clearly seems problematic, fat should not be limited. It is often well tolerated, pleasurable, and it provides a great source of calories small amounts.

Dental Health

Since gastroparesis impairs the stomach’s ability to mash food and break it down into smaller sizes in preparation for absorption, the chewing of food beforehand becomes even more important. In addition, repeated exposure to stomach acid from frequent vomiting may destroy tooth enamel.

Positioning

Patients may try sitting up after meals and maybe even go for a walk depending on how they feel.

Medications

There are quite a few medications that can delay stomach emptying –ask your doctor if any of the medications you are on could be slowing down your stomach emptying.

Getting Started

- Eat six or more small meals per day; avoid large meals.
- Avoid foods high in fat or too much fat added to foods (liquid fat in beverages is often tolerated).
- Eat nutritious foods first before filling up on “empty calories.”
- Chew foods well; solid food, such as meat may be tolerated if ground or puréed.
- High-fiber foods should be avoided because they may be more difficult for your stomach to empty or may cause bezoar formation. A bezoar is a mixture of food fibers that may get stuck in a stomach that does not empty well, similar to a hairball in a cat).
Examples of high fiber foods: All bran, popcorn, broccoli, beans (see table 1).
- Sit up while eating and for 1 hour after finishing; consider taking a quiet walk after meals.
- If you have diabetes, try to keep your blood sugar under control. Let your doctor know if your blood sugar runs >200 on a regular basis.

Tips for Maintaining your Diet

- Solid food is more work for the stomach to empty than liquids. On days when symptoms are worse, try taking only liquids to let the stomach rest. Any food may be used if it is liquefied, thinned, or blenderized and strained.
- Check your weight twice a week. If weight is decreasing, increase the consumption of liquid supplements or caloric beverages such as milkshakes, popsicles, gelatin, etc. If you lose more than 10 pounds unintentionally, let your doctor know.
- At meals take puréed foods and liquid supplements before coffee, tea or carbonated beverages.

Blenderized Food

- Any food can be blenderized, but solid foods will need to be thinned with some type of liquid.
 - **Meats, fish, poultry and ham:** Blend with broths, water, milk, vegetable or V-8 juice, tomato sauce, gravies.
 - **Vegetables:** Blend with water, tomato juice, broths, strained baby vegetables.
 - **Starches:** potatoes, pasta: Blend with soups, broth, milk, water, gravies; add strained baby meats, etc to add protein if needed. Consider using hot cereals such as cream of wheat or rice, grits, etc as your “starch” at lunch and dinner.
 - **Fruits:** Blend with their own juices, other fruit juices, water, strained baby fruits.
 - **Cereals:** Make with caloric beverage such as whole milk, soy or rice milk, juice, Ensure or equivalent, etc., instead of water. Add sugars, honey, molasses, syrups, or other flavorings, butter or margarine for extra calories.
 - **Mixed dishes:** Lasagna, macaroni and cheese, spaghetti, chili, chop suey – add adequate liquid of your choice, blend well and strain.
- If the blenderized item comes out “lumpy”, you can strain it through a fine metal kitchen strainer (get at a kitchen store, Wal-Mart, etc) or cheesecloth (a fine material available at most fabric stores) such as Linens ‘N’ Things @ <http://www.lnt.com/product/index.jsp?productId=1355540> or call 1-866-568-7378.
- If you do not have a blender, strained baby foods will work and can be thinned down as needed with milk, soy or rice milk, water, broth, etc.
- Always clean the blender well. Any food left on the blender could cause food poisoning.

Getting your Calories

When getting enough calories is a daily struggle...

- High calorie drinks are better than water (provide calories **AND** fluid); use peach, pear or papaya nectar, cranberry juice, orange juice, Hawaiian Punch, Hi C, lemonade, Kool-Aid.
- Fortify milk by adding dry milk powder – 1-cup powder to 1-quart milk.
- Use whole milk or evaporated milk (if tolerated) instead of skim or 2% for drinking and preparing “cream type” soups, custards, puddings, and milkshakes.
- Add instant breakfast, protein powder, dry milk powder, or other flavored powders or syrups to whole milk or juices.
- Make custards and puddings with eggs or egg substitutes (such as Eggbeaters).
- Try adding ice cream, sherbets, sorbets to ready-made supplements such as Nutrashakes, Ensure or Boost (see table 5).

Table 2 Examples of Fat Free Protein Sources

Product	Serving Size	Protein (g)
High-protein Foods		
Egg Beaters®	¼ c	6
Better n’ Eggs®	¼ c	5
Egg whites, separated, cooked	2	7
Powdered egg whites	1 tbs	11.5
Egg white (Bob’s Red Mill®)	2 tsp	3
Just Whites® (Deb EL™)	2 tsp	3
Fat free luncheon meat	1 oz	6
Fat free milk	8 oz	8
Non fat dry milk powder	2 tbs	10
Non fat cheese	1 oz	8
Evaporated skim milk	½ c	9
Non fat cottage cheese	½ c	13
Non fat yogurt (plain)	8 oz	12
High protein broth (Hormel HealthLabs (800/866-7757))	6 oz	10
High-protein gelatin (Hormel HealthLabs (800/866-7757))	4 oz	12

Fat-free Oral Liquid Supplements		
Boost® Breeze™	1 can	8
Enlive!® Clear Liquid Beverage	1 box	10
Resource® Fruit Beverage	1 box	9
Nutritional Supplement Protein Powders		
Beneprotein® Instant Protein Powder (Novartis 800/622-2689)	1 scoop	6
Casec® (MJ 800/247-7893)	1 tsp	5.6
Promod® (Ross 800/986-8502)	1 scoop	6.6
ProPass® (Hormel HealthLabs 800/866-7757)	1 scoop	6
HI ProCal™ (Hormel HealthLabs 800/866-7757)	1 packet	8

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Table 3 OPTIONS WHILE ON A CLEAR LIQUID DIET

Clear Liquids
<ul style="list-style-type: none">◆ All tea and plain coffee◆ Clear juices such as apple, cranberry, grape◆ Fruit-flavored drinks◆ Carbonated beverages/soda (may cause gas and bloating/distension in some patients);<ul style="list-style-type: none">○ Can let sit until flat◆ Sports drinks (Gatorade, All-Sport, etc.)◆ Broth, bouillon, consommé◆ Plain, flavored gelatins (such as Jell-O)◆ Fruit ices (Italian ice), sorbets◆ Popsicles without added fruit pieces (can also make your own with juices, Gatorade, etc.)◆ Clear liquid nutritional supplements (see contact information on supplement table 5):<ul style="list-style-type: none">❖ Boost Breeze❖ Enlive❖ Resource Fruit Beverage

Note: Sometimes clear liquids are more tolerated if small amounts of plain rice, potatoes, saltines, etc are taken with them.

Table 4 OPTIONS WHILE ON A FULL LIQUID DIET

Full Liquids
<ul style="list-style-type: none">◆ All fruit juices/ fruit nectars◆ Any fruit beverages◆ Vegetable, tomato or V-8 juice◆ Milks<ul style="list-style-type: none">○ Chocolate milk○ Buttermilk○ Lactaid milk○ Soy or rice milk○ Flavored milks:<ul style="list-style-type: none">▪ Carnation instant breakfast (or equivalent)▪ Ovaltine▪ Nesquik, etc.▪ Flavored syrups such as strawberry◆ Milkshakes, Eggnog◆ All tea and coffee drinks◆ Flavored coffees<ul style="list-style-type: none">○ Add whole milk, cream or flavored creamers such as: hazelnut, vanilla cream, etc.○ Starbuck's Frappaccino's, etc.◆ Smoothies* (see recipes)◆ Hot or cold cocoa◆ Kefir (liquid yogurt), Yoplait Nouriche, Go-gurts, etc.◆ Creamy type yogurt (vanilla, lemon, key lime, etc)◆ Custard, puddings◆ Smooth ice creams (no nuts, etc)◆ Hot cereal (low in fiber) such as: grits, cream of wheat, cream of rice, farina◆ Strained creamed soups◆ Thinned down strained vegetables, fruits, meats (such as strained baby foods)◆ Consider adding strained baby foods to broths or cream soups to increase nutritional value◆ To add calories to liquids:<ul style="list-style-type: none">○ Butter, margarine, sugar, honey, maple or other syrups◆ Hard candy (such as butterscotch, lemon drops, peppermint, etc.)

Table 5 COMMERCIAL NUTRITIONAL SUPPLEMENTS

Ensure Ensure Plus Enlive	Ross	800/986-8502	www.ross.com
Resource Resource Plus Resource Fruit Beverage Boost Boost Plus Boost Breeze	Novartis	800/438-6153 800/333-3785	http://www.novartisnutrition.com/us/home OR www.walgreens.com/store/novartis
Nutra /SHAKE	Nutra/Balance Products	800/654-3691	www.nutra-balance-products.com
NuBasics NuBasics Plus NuBasics Juices	Nestle	800/776-5446	www.nestleclinicalnutrition.com
Scandishakes	Scandipharm	800/950-8085	www.cysticl.org/handbook/html/scandipharm .htm
Slim Fast	Slim Fast	800/7546327	http://www.slim-fast.com
Atkins Advantage Ready-To-Drink Shakes	Atkins	800/628-5467	http://atkins.com/shop/products/ReadyToDrink_Shakes.html
<p>Note: Many larger pharmacy and food chains have their own brands of liquid supplements:</p> <ul style="list-style-type: none"> ◆ Wal-Mart: “Nutritional Supplement” ◆ CVS Pharmacy: “Liquid Nutrition” ◆ Kroger: “Fortify” and Fortify Plus” ◆ Giant: “Nutritional Drink” 			

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Table 6 RECIPES FOR SMOOTHIES, SHAKES, FRUIT BLENDS, FRUIT DRINKS

The following recipes are only suggestions for liquid calories at a time when it may be difficult of think of ideas...

Some tips:

- Fortified milk can be substituted to increase protein if needed.
To make fortified milk:
 - 1 quart whole milk
 - 1 cup nonfat instant dry milk
 - Pour liquid milk into deep bowl.
 - Add dry milk and beat slowly with beater until dry milk is dissolved.
 - Refrigerate and serve cold.
- Soy or rice milks can be substituted for milk in any recipe.
- Flavor extracts such as vanilla, almond, coffee, etc can be added for interest.
- Other flavorings such as dry gelatin (e.g., Jell-O) or pudding mixes, syrups, etc. can be added for additional flavors or extra calories.
- Ice/ ice chips can always be blended in if desired.
- When using canned fruits for recipes, for additional calories use those in heavy syrup.
- Frozen yogurts, ice creams, sorbets, sherbets, soy and rice products can be substituted in any recipe.
- Sugar free ice creams, yogurts and gelatins, etc., can be substituted as needed for regular ones.
- For extra flavor, texture, and calories, add a frozen banana
Freezing Bananas:
When bananas are ripe, peel, cut in half, and place in a covered container or baggie
Freeze overnight.

SMOOTHIES

Unless otherwise specified, mix all ingredients together in a blender until smooth.

<p><u>Fruity Yogurt Sipper</u> 1 ripe large banana or, 2 medium peaches, peeled and pitted 1 ½ cups whole milk 1 8 oz carton vanilla yogurt 1-2 tbsp powdered sugar ½ cup ice cubes Cut fruit into chunks. Combine all ingredients except ice in a blender until smooth. Add ice, one cube at a time. Blend until smooth.</p> <p><u>Strawberry Yogurt Frappe</u> 1 Tb strawberry syrup or other flavoring ½ cup vanilla yogurt ½ Milk ¼ cup orange Juice Dash vanilla</p>	<p><u>Basic Smoothie</u> ½ cup vanilla yogurt (or other creamy smooth yogurt such as lemon, key lime, etc.) 1 small ripe banana</p> <p><u>Tropical Smoothie</u> ½ cup creamy fruit yogurt ½ banana 1 oz. orange Juice</p> <p><u>Peach Plus</u> ½ Peach, canned ¼ cup vanilla yogurt ¼ Milk Dash vanilla Dash nutmeg</p>
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SHAKES

Unless otherwise specified, mix all ingredients together in a blender until smooth.

<p><u>Super Milkshake</u> ½ cup fortified milk 1-2 scoops high fat ice cream 1 packet Instant Breakfast</p> <p><u>Chocolate Peanut Butter Shake</u> 1 can chocolate Ensure or Boost (or “Plus”) 2 tbsp. smooth peanut butter 2 scoops vanilla ice cream</p> <p><u>High-protein Shake</u> 1 cup fortified milk ½ cup ice cream ½ tsp vanilla extract 2 tbsp butterscotch, chocolate, or your favorite fruit syrup or sauce *For variety, add ½ cup banana or 1 tbsp smooth peanut butter and 2 tsp sugar</p> <p><u>Orange Breakfast Nog</u> 1 ½ cups buttermilk 2 tbsp brown sugar 1 tsp vanilla extract 2-3 large ice cubes 1/3 cup of frozen orange juice concentrate Combine all ingredients except ice in a blender until smooth. Add ice, one cube at a time. Blend until smooth and frothy.</p>	<p><u>Sherbet Drink</u> ½ cup milk or fortified milk (see table 6) 1-2 scoops sherbet or sorbet <i>Can substitute for ½ cup milk:</i></p> <ul style="list-style-type: none"> ◆ Nutren 1.5, unflavored ◆ Osmolite, Osmolite HN ◆ Isocal, Isocal HN ◆ Soy milk <p>Optional: Add ½ cup vanilla ice cream for “Dreamsicle equivalent”</p> <p><u>High-Calorie Malt</u> ½ cup whole milk 1 tbsp malted milk powder ½ cup half and half 1 oz package Instant Breakfast, any flavor 2 cups ice cream, any flavor 2 tbsp Ovaltine</p> <p><u>Fruit and Cream</u> 1 cup whole milk 1 cup vanilla ice cream 1 cup canned fruit in heavy syrup (peaches, apricots, pears) Almond or vanilla extract to taste.</p>
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FRUIT BLENDS	
Combine these recipes in a blender until smooth.	
<p><u>Pear</u> ½ cup canned pears ½ cup cottage cheese</p> <p><u>Peach</u> ½ cup canned peach ½ cup cottage cheese</p> <p><u>Banana-Apple</u> ½ small banana ½ cup cottage cheese ¼ cup apple Juice</p>	<p><u>Chill these next 3 until firm:</u></p> <p>Option 1 ¼ cup cottage cheese ¼ cup vanilla ice cream ½ cup prepared gelatin</p> <p>Option 2 ¼ cup flavored yogurt ¼ cup vanilla ice cream ½ cup prepared gelatin</p> <p>Option 3 ¼ cup ricotta or cottage cheese ¼ cup vanilla ice cream ½ cup blended fruit ½ cup prepared gelatin</p>

FRUIT DRINKS	
Unless otherwise specified, mix all ingredients together in a blender until smooth.	
<p><u>Bucky Badger Punch</u> 1 quart cranberry juice cocktail 1 cup orange juice 1 cup grapefruit juice 2 cups 7-up or club soda Combine the 3 juices in a pitcher. Add 7-up or club soda when ready to serve.</p> <p><u>High-protein Fruit Drink</u> 8 oz Enlive, Boost Breeze, Resource or Resource Plus ½ cup sherbet 6 ounces gingerale</p> <p><u>Sherbet Punch</u> 1 cup sherbet 12 oz gingerale</p>	<p><u>Slushy punch</u> 1 cup sugar 2 ripe medium bananas, cut up 3 cups unsweetened pineapple juice 2 tbsp lime juice 1 6 oz can frozen orange juice concentrate 1 1-liter bottle carbonated water or lemon-lime beverage, chilled Combine carbonated water and sugar until dissolved. In a blender, combine bananas and juices. Blend until smooth. Add to sugar mixture. Pour in carbonated water.</p> <p><u>Frozen Fruit Slush</u> 1-6 ounce can frozen fruit juice concentrate 4 tbsp sugar 3 cups crushed ice</p>

Table 7 SAMPLE SEMI LIQUID MEAL PATTERN

<p><u>BREAKFAST</u></p> <p>Citrus Juice or other beverage containing vitamin C Thinned Cooked Cereal Liquid Supplement or Milkshake (see suggestions) Milk Coffee or Tea Cream, Sugar</p> <p><u>LUNCH AND DINNER</u></p> <p>Thinned Soup Thinned or Puréed Meat or Substitute Thinned Potato or Substitute Thinned or Puréed Vegetable Thinned Dessert or Puréed Fruit Liquid Supplement or Milkshake Milk Coffee or Tea Cream, Sugar Salt and Pepper</p> <p><u>SNACK: MID-MORNING, AFTERNOON AND BEDTIME</u></p> <p>Milk or Fruit Juice Liquid Supplement or Milkshake (see suggestions)</p>

Table 8 RESOURCES

<ul style="list-style-type: none">◆ Gastroparesis Dysmotility Association: www.gpda.net◆ American Motility Society: www.motilitysociety.org◆ American Dietetic Association: www.eatright.org◆ University of Virginia Health System, Digestive Health Center of Excellence<ul style="list-style-type: none">➤ http://www.healthsystem.virginia.edu/internet/digestive-health/nutrition.cfm➤ Go to: Nutrition Articles in Practical Gastroenterology Link➤ 2003 Archives➤ March 2003 (article on gastroparesis)
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