

Diet Intervention for Gastroparesis and Diabetes Mellitus

Introduction

Gastroparesis means “stomach (*gastro*) paralysis (*paresis*).” In gastroparesis, your stomach empties too slowly. Gastroparesis can have many causes, so symptoms range from mild (but annoying) to severe, and can vary week-to-week or even day-to-day.

This handout is designed to give some suggestions for diet changes in the hope that symptoms will improve or even stop. Very few research studies have been done to guide us as to which foods are better tolerated by patients with gastroparesis. The suggestions are mostly based on experience and our understanding of how the stomach and different foods normally empty. Anyone with gastroparesis should see a doctor and a Registered Dietitian for advice on how to maximize their nutritional status.

Keep in mind that if you are losing weight because you aren't able to eat enough, *any calorie is a good calorie.*

This is particularly true if you are facing the possibility of tube or IV feeding to provide nourishment. You may need to put prior dietary restrictions on hold until you can meet your basic nutritional needs.

Diabetes and Gastroparesis

If gastroparesis is due to diabetes, the most important goal is to achieve or maintain good glucose control. The best way to do this is by monitoring your blood glucose levels often and adjusting the amount of insulin given throughout the day.

Because of your gastroparesis, food intake may be inconsistent. The amount of food you are able to take may vary from meal to meal and day to day. As a result, blood glucose levels can fluctuate throughout the day.

Also, it is common for your insulin requirement to increase because of the need to add nutritional supplements.

How to Eat Enough and Keep Your Blood Glucose Under Control

- Eat 5 to 6 small meals each day instead of 3 large meals. Try to keep the amount of carbohydrate at each meal about the same. The amount of total carbohydrate that the average person needs each day is about 12 to 16 carbohydrate choices (1 choice = 15 grams of carbohydrate) or 210 to 240 grams of total carbohydrate each day.

Example: If you eat six small meals each day, that would be about 2 to 3 carbohydrate choices (or 30 to 45 grams of carbohydrate) at each meal.

- If you take short- or rapid-acting insulin before each meal, it is important to adjust the amount of insulin that you take before the meal based on the amount of carbohydrate in the meal. This is called your *insulin to carbohydrate ratio* and your health care provider or diabetes educator will teach you more about it. This is very helpful to keep your glucose levels within the target range after the meal (less than 180 mg/dl).

- If you take 2 doses of fixed short- and intermediate-acting insulin (i.e., NPH), it is even more important to keep the amount of carbohydrate at each meal about the same from day to day. This will help with glucose control and also help avoid low blood sugar.
- Eat and drink all foods and beverages while sitting up.
- Solid foods are often better tolerated earlier in the day. Try switching to liquid meals later in the day.
- Monitor blood glucose levels before the small meal or snack is eaten and adjust insulin dose according to the blood glucose level and the amount of carbohydrate to be eaten.
- Many people need a *basal* dose of insulin (NPH or glargine) at bedtime or in the evening and a *bolus* or supplemental dose of short-acting (regular) or rapid-acting insulin (Aspart or Lispro) with meals or snacks. Some people need to do this about 30 minutes after their meal, once they are sure the meal will stay down.

If you are only able to tolerate liquids, choose those with more nutrients!

Examples are milk, liquid supplements, fruit juices, or smoothies. These should replace sugar-sweetened beverages. But remember, the total amount of carbohydrate is more important than the source when it comes to controlling your blood sugar. The more consistent you are with the amount of carbohydrate you take at each meal (whether in solid or liquid form), the easier it will be to maintain stable blood sugar levels.

Essential Nutrients

Calories - A calorie is energy provided by food. You need calories 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 60 grams of protein per day to meet their protein needs.
Examples: meats, fish, poultry, milk, eggs, cheeses (see table 2).
- **Carbohydrate** (starches and natural sugars) – Our main 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, fruit
- **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 – a little goes a long way!
Examples: butter, mayonnaise, oils, lard, olives, avocados, nut butters.

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 – These are 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 and other nutrients. If you have a lot of vomiting and have lost a lot of weight, your doctor or registered 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.

Other specific nutrients – People who have had a big weight loss are at risk for multiple nutrient deficiencies. The most common nutrient deficiencies seen in patients with gastroparesis are iron, vitamin B12 (cyanocobalamin), vitamin D, and calcium. To replace these nutrients, a standard multiple vitamin and mineral supplement may be beneficial. Talk to your doctor or registered dietitian.

The Basics of the Gastroparesis Diet

Volume - The larger the meal, the slower the stomach will empty. It is important to decrease the amount of food eaten at a meal, so you will have to eat more often. Smaller meals more often (6-8 or more if needed) may allow you to eat enough.

Liquids versus solids - If eating less at each meal and increasing the number of "meals" does not work, the next step is to switch to more liquid-type foods. Liquids empty the stomach more easily than solids do. Pureed foods may be better also.

Fat - Fat slows stomach emptying, but many people with gastroparesis have no trouble with fat in beverages like whole milk, milkshakes, and nutritional supplements. *Unless a fat-containing food or fluid clearly causes worse symptoms, fat should not be limited.* Eating enough may be very hard to do, and liquid fats provide a great source of calories in smaller amounts.

Fiber - Fiber may slow stomach emptying and fill it up too fast. This won't leave room for enough calories and protein. A *bezoar* is a mixture of food fibers that may get stuck in the stomach and not empty well, like a hairball in a cat. For patients who have had a bezoar, a fiber restriction is important. This includes avoiding over-the-counter fiber medicines like Metamucil®.

High Fiber Foods

- Legumes/dried beans (refried beans, baked beans, black-eyed peas, lentils, black, pinto, northern, fava, navy, kidney, garbanzo beans, soy beans)
- Bran/whole grain cereals (such as bran cereals, Grape-Nuts®, shredded wheat type, granolas)
- Nuts and seeds (pumpkin seeds, soy nuts, chunky nut butters)
- Fruits (blackberries, blueberries, raspberries, strawberries, oranges, kiwi)
- Dried fruits (apricots, dates, figs, prunes, raisins)
- Vegetables (green peas, broccoli)
- Popcorn

Foods Associated with Bezoar Formation

Apples, berries, Brussels sprouts, coconuts, corn, figs, green beans, legumes, oranges, persimmons, potato peels, sauerkraut, tomato skins

High Fiber Medications/Bulking Agents

Examples include: Acacia fiber; Benefiber®; Citrucel®; FiberChoice®; Fibercon®; Konsyl®; Metamucil®; Perdiem Fiber; any psyllium product

The Basics of the Gastroparesis Diet (Continued)

Dental Health – Normally, the stomach helps “chew” food a second time, but in gastroparesis, it’s not good at this. So, chewing food really well before you swallow is even more important. Plus, frequent vomiting wears down tooth enamel. Make every effort to see your dentist regularly and take good care of your teeth.

Medications - There are quite a few medications that can slow stomach emptying. Ask your doctor if any of the medicines you are on could be slowing down your stomach emptying.

10 Tips:

DO:

1. Set a goal weight you want to meet or keep. Then, check your weight twice a week.
2. Eat enough to meet your goal weight. It may be 4-8 smaller meals and snacks. If your weight is decreasing, drink more liquid supplements or milkshakes and eat more popsicles, gelatin, etc.
3. Eat nutritious foods first, before filling up on “empty calories” like candy, cakes, sodas, etc.
4. Chew foods well, especially meats. Meats may be easier to eat if ground or puréed.
5. Sit up while eating and stay upright for at least 1 hour after you finish. Try taking a nice walk after meals.

DON'T:

1. Eat large meals.
2. Eat solid foods that are high in fat.
3. Add too much fat to foods (e.g., butter, mayonnaise, etc.).
4. Avoid high fat drinks like whole milk, shakes, and supplement drinks. Most people tolerate these just fine, so try them! Only avoid them if they make your symptoms worse.
5. Eat high fiber foods or take fiber medicines like those on page 4.

On bad days, remember that solid food is more work for the stomach to empty than liquids. So, try taking just liquids to let the stomach rest. Any food may be used if it is liquefied, thinned, or blenderized and strained.

If you lose more than 10 pounds without trying, tell your doctor.

When Solids Do Not Seem to Be Working – Try Blenderized Food

Any food can be blenderized, but solid foods will need to be thinned down with some type of liquid. Always clean the blender well. Any food left in the blender for more than 1-2 hours could cause food poisoning. 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.

- **Meats, fish, poultry and ham:** Blend with broths, water, milk, vegetable or V-8[®] juice, tomato sauce, gravies.
- **Vegetables:** Blend with water, tomato juice, broth, strained baby vegetables.
- **Starches:** Blend potatoes, pasta, and rice with soups, broth, milk, water, gravies; add strained baby meats, etc. to add protein if needed. Consider using hot cereals such as wheat farina or cream of 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 (or even evaporated/condensed milk), soy or rice milk, juice, Ensure[®], Boost[®] or store brand equivalent, etc., instead of water. Add sugars, honey, molasses, syrups, or other flavorings, butter or vegetable oil for extra calories.
- **Mixed dishes:** Add adequate liquid of your choice to lasagna, macaroni and cheese, spaghetti, chili, chop suey, etc. Then, blend well and strain.

Getting your Calories

When getting enough calories is a daily struggle, make everything you eat and drink count. *NOTE: If you are going to try these calorie-boosting strategies, talk to your diabetes care team first. You may need to make adjustments in your diabetes medication or insulin to cover the additional carbohydrate calories.*

- Take medications with calorie-containing beverages like milk and juice.
- High calorie drinks are better than water because they provide calories AND fluid.
- Fortify milk by adding dry milk powder: add 1 cup powdered milk to 1 quart milk.
- Drink whole milk if tolerated instead of skim or reduced fat. Use whole, condensed, or evaporated milk when preparing cream-based soups, custards, puddings, and hot cereals, smoothies, milkshakes, etc.

- Add Carnation® Instant Breakfast, protein powder, dry milk powder, or other flavored powders or flavored syrups to whole milk or juices.
- Make custards and puddings with eggs or egg substitutes like Eggbeaters®.
- Try adding ice cream, sherbet, and sorbet to ready-made supplements such as Nutra-shakes Sucrose Free®, Glucerna®, or Boost® Glucose Control. Peanut butter, chocolate syrup, or caramel sauce is also great in these.

Adding Protein to your Diet: Examples of Protein Sources

Product*	Serving Size	Protein (g)	Carbohydrate (g)*
Egg Beaters®	¼ c	6	**
Better n'Eggs®	¼ c	5	**
Egg whites, separated, cooked	2	7	**
Powdered egg whites	1 tablespoon	11.5	**
Egg white (Bob's Red Mill®)	2 teaspoon	3	**
Just Whites®(Deb EL™)	2 teaspoon	3	**
Fat free luncheon meat	1 oz	6	**
Fat free milk	8 oz	8	12
Non-fat dry milk powder	3 tablespoon	10	11
Non-fat cheese	1 oz	8	**
Evaporated skim milk	½ c	9	15
Non-fat cottage cheese	½ c	13	**
Non-fat yogurt (plain)	8 oz	12	15
High protein broth (Bernard® 800-323-3663)	1 cup	8	26
High protein gelatin (Bernard® 800-323-3663)	½ cup	11	25
High protein egg whites (Bernard® 800-323-3663)	1 tablespoon	5	0
UNJURY® Unflavored Whey Protein (800-517-5111)	1 scoop	20	0
Pro-Stat®(Medical Nutrition USA™, Inc. 1-800-221-0308)	2 tablespoons	15	0
Beneprotein® (Nestle® 888-240-2713)	1 scoop	6	0

* Carbohydrate content may vary among brands and may change over time; check product nutrition labels for the most up to date nutritional information.

** Not considered carbohydrate choices-amount of carbohydrate is minimal.

Carbohydrate Content of Nutritious Liquids

Sometimes it is hard to think of ideas when you are tired and nauseated. The ideas and simple recipes below are intended to provide some suggestions when gastroparesis has you down. Remember, good glucose control is essential to not only help with nausea control, but also so the body can use the nutrition that you eat and drink.

NOTE: The nutritional information provided below is meant only as a guide. Product ingredients and nutrient content can vary among brands and change over time. Check nutrient labels for the most up to date nutritional information on a specific product.

Clear Liquids*	Carbohydrate(g)**
All teas and coffees (plain, no sugar)	0
Clear juices such as:	
♦ Apple - ½ cup	15
♦ Cranberry – 1/3 cup	15
♦ Grape – 1/3 cup	15
Fruit-flavored drinks (1/3 cup)	15
Carbonated beverages/soda (regular, 12 oz)	39
Carbonated beverages/soda (diet, 12 oz)	0
Gatorade® – 12 oz	21
G2® Gatorade – 12 oz	7
Broth, bouillon, consume' (1 cup)	1
Plain, flavored gelatins (Regular ½ cup)	19
Popsicle® (1 piece)	11
Sorbet (½ cup)	22
Clear liquid type supplements (see table 5):	
♦ Ensure® Clear (Abbott) – 6.8 oz	43
♦ Boost® Breeze (Nestle®) - 8oz	54
♦ NUTRA/Shake® Fruit Plus (Nutra/Balance)	44
♦ NUTRA/Shake® Fruit Plus Free (Nutra/Balance)	39
♦ Resource® DIABETISHIELD® (Nestle®)	30

*Note: Clear liquids may be better tolerated if small amounts of plain rice, potatoes, saltines, etc. are taken with them (see carbohydrate amount for each).

** Carbohydrate content may vary among brands and may change over time; check product nutrition labels for the most up to date nutritional information.

Full Liquids	Carbs (g)*
All juices (nectars, fruit juices of any kind) – ½ cup	15
Tomato or V-8 [®] juice – ½ cup	5
Puddings or Custard – ½ cup	24
Smooth ice cream (no nuts, chunks, etc), ½ cup	18
Hot cereal (low in fiber) such as grits, cream of wheat, cream of rice, or farina (½ cup)	19
Milks	
◆ Regular milk (1 cup; 1% low fat, 2% reduced fat, or skim)	12
◆ Chocolate milk (1 cup; 1% low fat, 2% reduced fat)	26
◆ Buttermilk (1 cup)	12
◆ Lactaid [®] milk (1 cup)	12
◆ Soy or rice milk (plain, 1 cup)	8
Carnation [®] Instant Breakfast [™] (or other instant breakfast powder)	
◆ Made with 1 cup water	27
◆ Made with 1 cup milk	39
Carnation [®] Instant Breakfast Essentials [™] Ready to Drink	41
Carnation [®] Instant Breakfast Essentials [™] Ready to Drink No Sugar Added	16
Carnation [®] Instant Breakfast [™] No Sugar Added Powder	
◆ Made with water	12
◆ Made with 1 cup milk	24
Ovaltine [®] (4 tablespoons with 1 cup of milk)	30
Nesquik [®] (2 tablespoons chocolate)	14
Nesquik [®] No Sugar Added (2 tablespoons chocolate)	7
Milk with flavored syrups such as strawberry (1 cup milk & 1 tablespoon syrup)	25-30
Eggnog (1 cup)	34-48
Milkshakes (10 oz milkshake)	Varies
All tea and coffee drinks (plain, no sugar)	0
◆ Add whole milk, cream or flavored creamers (1 tablespoon)	3
◆ Coffee Frappuccino [®] Light Blended Beverage	27
Smoothies	See below
Hot or cold cocoa (1 packet mixed with water)	22
Hot or cold cocoa (1 packet mixed with 6 oz milk)	31
Kefir (liquid yogurts), plain, 1 cup	12
Kefir (liquid yogurts), flavored, 1 cup	25
Yoplait [®] Go-GURT [®] , etc. (2.25 oz)	13
Small yogurt smoothie drinks (Danimals [®] , DanActive [®] , etc) (3.1 oz)	13-15
Yogurt, plain, 1 cup	12
Yogurt, fruited/flavored	Varies

Full Liquids (continued)	Carbs (g)*
Strained cream soups (1 cup) Consider adding to broth or creamy soups: <ul style="list-style-type: none"> ◆ Strained vegetables, meats (such as strained baby foods) ◆ Butter, margarine 	10
Sugar, hard candy, honey, syrups (1 tablespoon)	15

* Carbohydrate content may vary among brands and may change over time; check product nutrition labels for the most up to date nutritional information.

Commercial Nutritional Supplements			
Product	Serving Size	Carbs (g)*	Company, Website/Phone**
Ensure® Ensure® Plus Ensure® Clear™	8 oz 8 oz 6.8 oz	32-33 49-50 43	Abbott® http://abbottstore.com/ 1-800-258-7677
Boost® Breeze Boost® Boost® Plus Benecalorie®	8 oz 1.5 oz	54 41 45 0	Nestle® www.NestleNutrition.Store.com 1-888-240-2713
NUTRA/Shake Supreme NUTRA/Shake Sucrose Free	4 oz	32 25	Nutra/Balance Products www.nutra-balance-products.com 800-654-3691
Scandishake®	1 sachet w/8 oz milk	68	Aptalis http://store.foundcare.com/aptalis/ 844-754-9039
Slim Fast® Original Slim Fast® Advanced Nutrition Slim Fast® Smoothie	11 oz 11 oz 1 scoop w/8 oz milk	24 6 20	Slim Fast® www.Slimfast.com
Milk Shake Plus	4 TBS with 8 oz milk	37	Bernard Food Industries® www.bernardfoods.com 800-323-3663
Orgain Organic Nutrition	11 oz	32	Orgain: http://orgain.com/
Diabetic Products:			
Boost Glucose Control™ DiabetiSource® AC Glytrol®	8 oz	16-20 25 25	Nestle® www.NestleNutrition.Store.com 1-888-240-2713
Glucerna® Shake Glucerna® 1.0 Cal Glucerna® 1.2 Cal Glucerna® 1.5® Cal	8 oz	27 23 27 31	Abbott® http://abbottstore.com/ 1-800-258-7677

* Carbohydrate content may vary among brands and may change over time; check product nutrition labels for the most up to date nutritional information.

**Many of these products may also be sold through retail grocery stores or pharmacies (in store or online). Many larger pharmacy and food chains have their own brands of liquid supplements.

Recipe Ideas For Smoothies, Fruit Blends, Shakes And Fruit Drinks (1 Carb Choice = 15 g carbohydrate)

Note: Carbohydrate content of ingredients may vary among brands and may change over time; check product nutrition labels for the most up to date nutritional information. Some recipes make more than one serving.

Basic Fruit Smoothie

Can substitute other creamy yogurt for variety

- ½ cup low fat vanilla yogurt (22g CHO)
 - 1 small ripe banana (15g CHO)
- (Total Carb = 37g or 2.5 Carb choices)**

Pear Fruit Blend

Substitute peaches or fruit medley (if desired)

- ½ cup canned pears (in juice or extra light syrup: 15g CHO)
 - ½ cup cottage cheese (2%: 4g CHO)
- (Total Carb = 19g or 1 Carb choice)**

Peaches and Cream

Use pears, apricots, or mix for variety

- ½ cup whole milk (6g CHO)
- ½ cup vanilla ice cream (16g CHO)
- ½ cup peach canned in juice (15g CHO)
- Almond or vanilla extract to taste

Blend all ingredients and chill well before serving.

(Total Carb = 36g or 2.5 Carb choices)

Vanilla Chiller

- ¼ cup cottage cheese (2%: 2g CHO)
- ¼ cup vanilla ice cream (9g CHO)
- ½ cup prepared gelatin (19g CHO)

(Total Carb = 30g or 2 Carb choices)

Fruity Yogurt Sipper (2 servings)

- 1 ripe large banana or 2 medium peaches, peeled and pitted (30g CHO)
- 1 ½ cups whole milk (18g CHO)
- 1 cup vanilla yogurt (light: 18g CHO)
- 1 tablespoon powdered sugar (15g CHO)
- 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.

(1 serving = 40.5g carb or 2 Carb choices)

Chocolate Peanut Butter Shake

- 1 can choc. Ensure® or Boost® (32-40g CHO)
- 2 tbsp smooth peanut butter (6g CHO)
- ½ cup vanilla ice cream (18g CHO)

(Total Carb=56-64g or 4 Carb choices)

High-Protein Shake

- 1 cup fortified milk (12g CHO)
- ½ cup ice cream (18g CHO)
- ½ teaspoon vanilla extract
- 2 tablespoons butterscotch, chocolate, or your favorite syrup or sauce (24g CHO)

Put all ingredients in a blender. Blend at low speed for 10 seconds.

(Total Carb = 66g or 4.5 Carb choices)

*For variety, add ½ cup banana or 1 tbsp smooth peanut butter (will increase CHO content)

Fruity Chiller

- ¼ cup ricotta or cottage cheese (2%: 2g CHO)
- ¼ cup vanilla ice cream (9g CHO)
- ½ cup blended fruit (15g CHO)
- ½ cup prepared gelatin (19g CHO)

(Total Carb = 45g or 3 Carb choices)

Super Milkshake

- ½ cup fortified milk (6g CHO)
- ½ cup high fat ice cream (18g CHO)
- 1 packet instant breakfast (28g CHO)

(Total Carb = 52g or 4 Carb Choices)

Sample Semi-Liquid Meal Pattern

BREAKFAST (4 Carb choices plus milkshake or supplement carbs)

Citrus Juice (1/2 cup: 15g CHO)

Thinned Cooked Cereal (1/2 cup cooked cereal: 19g CHO)

Milk (1 cup: 12g CHO)

Coffee or Tea (unsweetened: 0g CHO)

Cream, Sugar (1 tablespoon sugar: 15g CHO)

Liquid Supplement or Milkshake (see suggestions)

LUNCH AND DINNER (4 Carb choices)

Thinned Soup (1 cup chicken broth: 1g CHO)

Thinned or Puréed Meat or Substitute

Thinned Potato or Substitute (1/2 cup: 15g CHO)

Thinned or Puréed Vegetable (1/2 cup: 5g CHO)

Thinned Dessert or Puréed Fruit (½ cup fruit: 15g CHO)

Milk (1 cup: 12g CHO)

Coffee or Tea (unsweetened: 0g CHO)

Cream, Sugar (1 tablespoon sugar: 15g CHO)

Salt and Pepper

SNACK: MID-MORNING, AFTERNOON AND BEDTIME (varies)

Milk or Fruit Juice (1 cup milk or ½ cup juice: 15g CHO)

Liquid Supplement or Milkshake (see suggestions)

Additional Resources

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

◆ **University of Virginia Health System, Digestive Health Center website:**

www.GInutrition.virginia.edu

○ **Patient Education, gastroparesis**

- Short version
- Long version
- Diabetes version
- Renal version

○ **Nutrition Articles, search by topic, gastroparesis**

- Parrish CR, McCray S. Gastroparesis & Nutrition: The Art. Practical Gastroenterology, September 2011
- Parrish CR, Yoshida C. Nutrition Intervention for the Patient with Gastroparesis: An Update. Practical Gastroenterology, August 2005

◆ **Association of Gastrointestinal Motility Disorders, Inc. (AGMD)**

www.agmd-gimotility.org

◆ **International Foundation for Functional Gastrointestinal Disorders (IFFGD)**

<http://www.iffgd.org/>