

GASTROPARESIS: A REAL PAIN IN THE GUT



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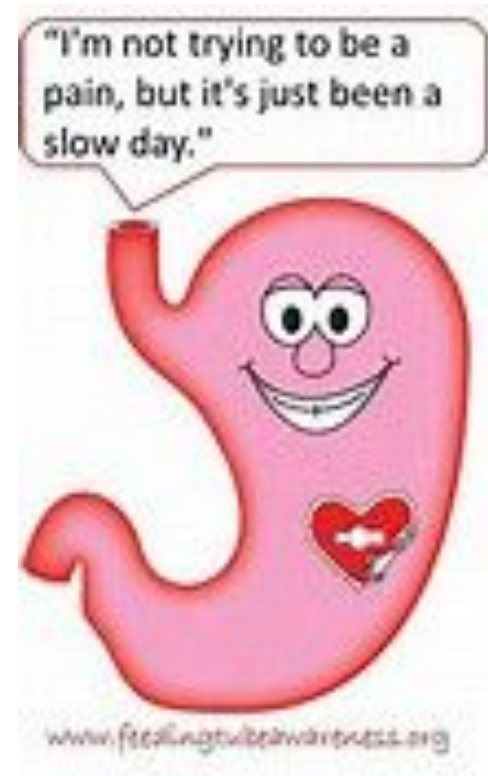
Objectives



- Define gastroparesis
- Describe signs and symptoms
- Discuss treatment options for diabetic gastroparesis:
 - ▣ Blood sugar management
 - ▣ Insulin adjustments
 - ▣ Diet

What is Gastroparesis?

- “Gastroparesis” means paralysis of the stomach
- Gastric emptying may be delayed or absent.
- Gastric neuropathy (gastropathy) can be a complication of uncontrolled diabetes.



Other Causes of Delayed Gastric Emptying:



- ❑ Mechanical obstruction
- ❑ Metabolic/endocrine disorders
- ❑ Acid-peptic disease
- ❑ Gastritis
- ❑ Post-gastric surgery
- ❑ Disorders of gastric smooth muscle
- ❑ Psychogenic disorders
- ❑ Neuropathic disorders
- ❑ Medications

Understanding Diabetic Gastroparesis



- It is a form of autonomic diabetic neuropathy
 - More prevalent in type 1
- The control of gastric motility by the vagus nerve is affected
- Digestion of food may be incomplete or delayed, causing symptoms
- Bezoars may form, requiring surgery

Understanding Gastroparesis: Signs and Symptoms

- ❑ Decreased appetite
- ❑ Nausea
- ❑ Vomiting- may contain undigested food
- ❑ Bloating
- ❑ Early satiety
- ❑ Unexpected fullness (especially in the morning after an overnight fast)
- ❑ Heartburn
- ❑ Epigastric pain
- ❑ Bad breath
- ❑ Belching
- ❑ Unintentional weight loss
- ❑ Malnutrition

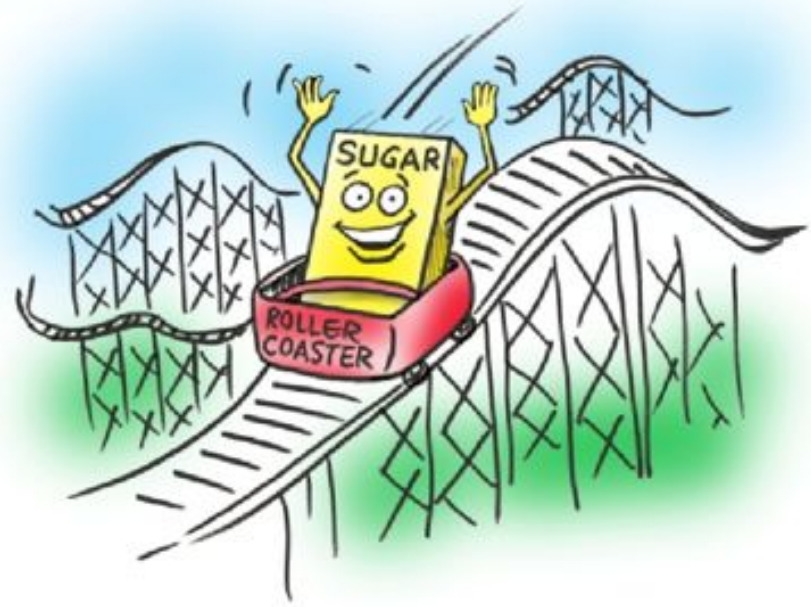
Impact of Diabetes on Gastroparesis



- Hyperglycemia (>200) can cause **temporary** symptoms of gastroparesis
- Repeated hyperglycemia over time can cause gastroparesis (A1c $>9.5\%$)

Impact of Gastroparesis on Diabetes

- Unpredictable blood sugar swings
- Elevated HbA1c
- Hypoglycemia soon after eating



Personal Impact of Gastroparesis

- Pain and discomfort
- Diet feels unhealthy – “it’s not what I’ve learned to eat”
- Pleasure in eating
- Eating out
- Unpredictable blood sugars
- Difficulty regulating insulin



Diagnosing Gastroparesis



- ❑ Endoscopy
- ❑ Scintigraphy
 - ❑ Gastric emptying study with food
- ❑ Radioisotope breath testing
- ❑ Electrogastrography
- ❑ Manometry

Diagnosing Gastroparesis

Nuclear Medicine Scintigraphy

- Gold standard for evaluating gastric emptying
 - ▣ Ingesting a standard radio labeled meal, usually eggs
 - ▣ Camera scans abdomen regularly for 4 hours
 - ▣ Disappearance of radiation signal from the stomach corresponds to emptying of eggs
 - ▣ Speed compared with normal speed



Normal Gastric Emptying versus Delayed Gastric Emptying

Time	Normal	Grade 1 (Mild)	Grade 2 (Moderate)	Grade 3 (Severe)	Grade 4 (Very Severe)
0 hours					
1 hour	37-90%				
2 hours	30-60%				
3 hours	Up to 30%				
4 hours	0-10%	11-20%	21-35%	36-50%	>50%

Gastroparesis is diagnosed if the test meal takes longer than normal to leave the stomach.

Percentage of test meal remaining in stomach after four hours shows how severe the gastroparesis is.

Managing Gastroparesis



- ❑ **Improvement of blood glucose**
- ❑ **Dietary adjustments**
- ❑ Medications
- ❑ Electrical stimulation therapy
- ❑ Electrical pacing
- ❑ Nutrition support
 - ▣ Tube Feeding, TPN, PPN
- ❑ Complementary therapies for symptoms (ginger, acupuncture)

Managing Diabetes in Gastroparesis: Improve Blood Glucose Control

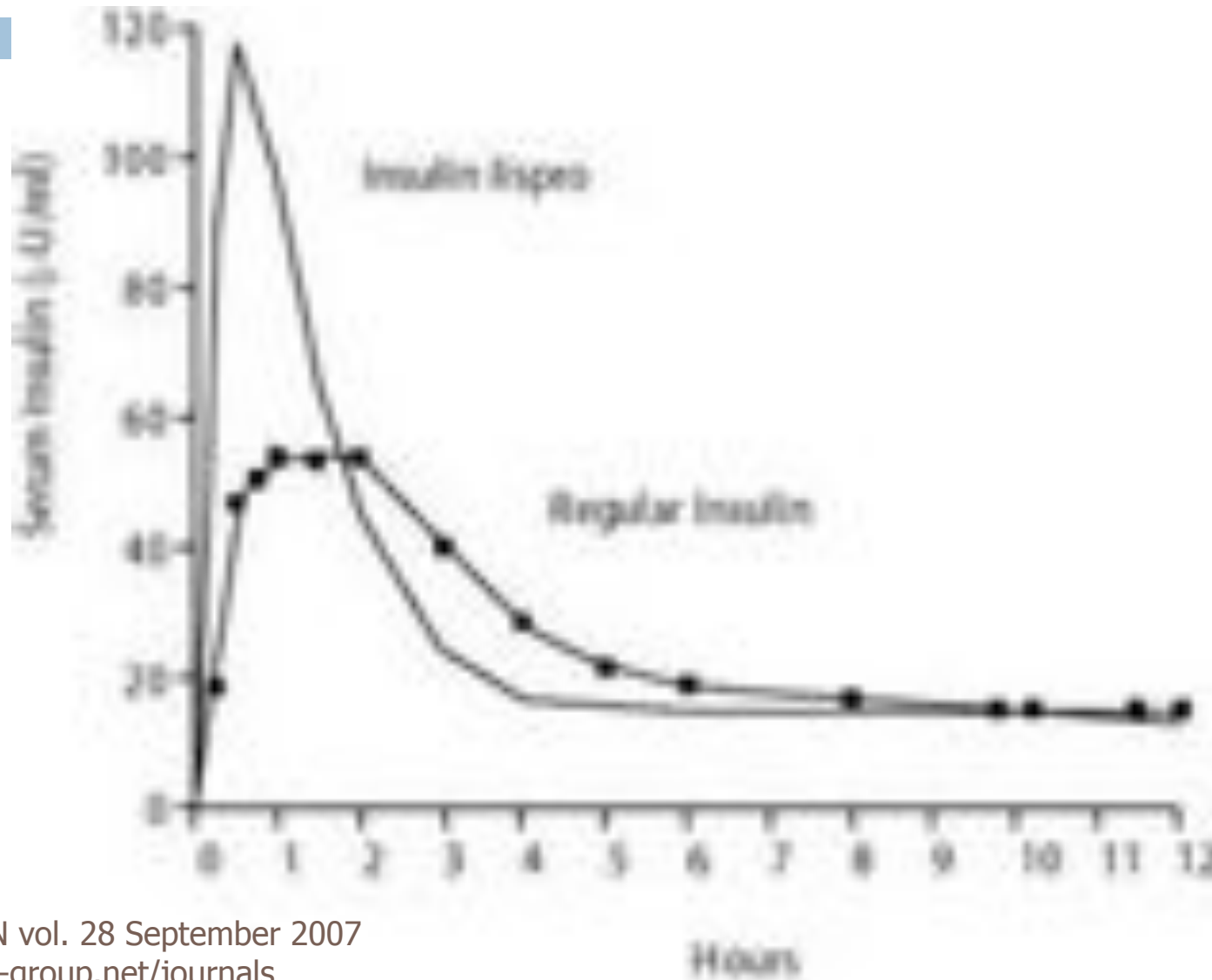
Reducing high blood sugars
often improves symptoms



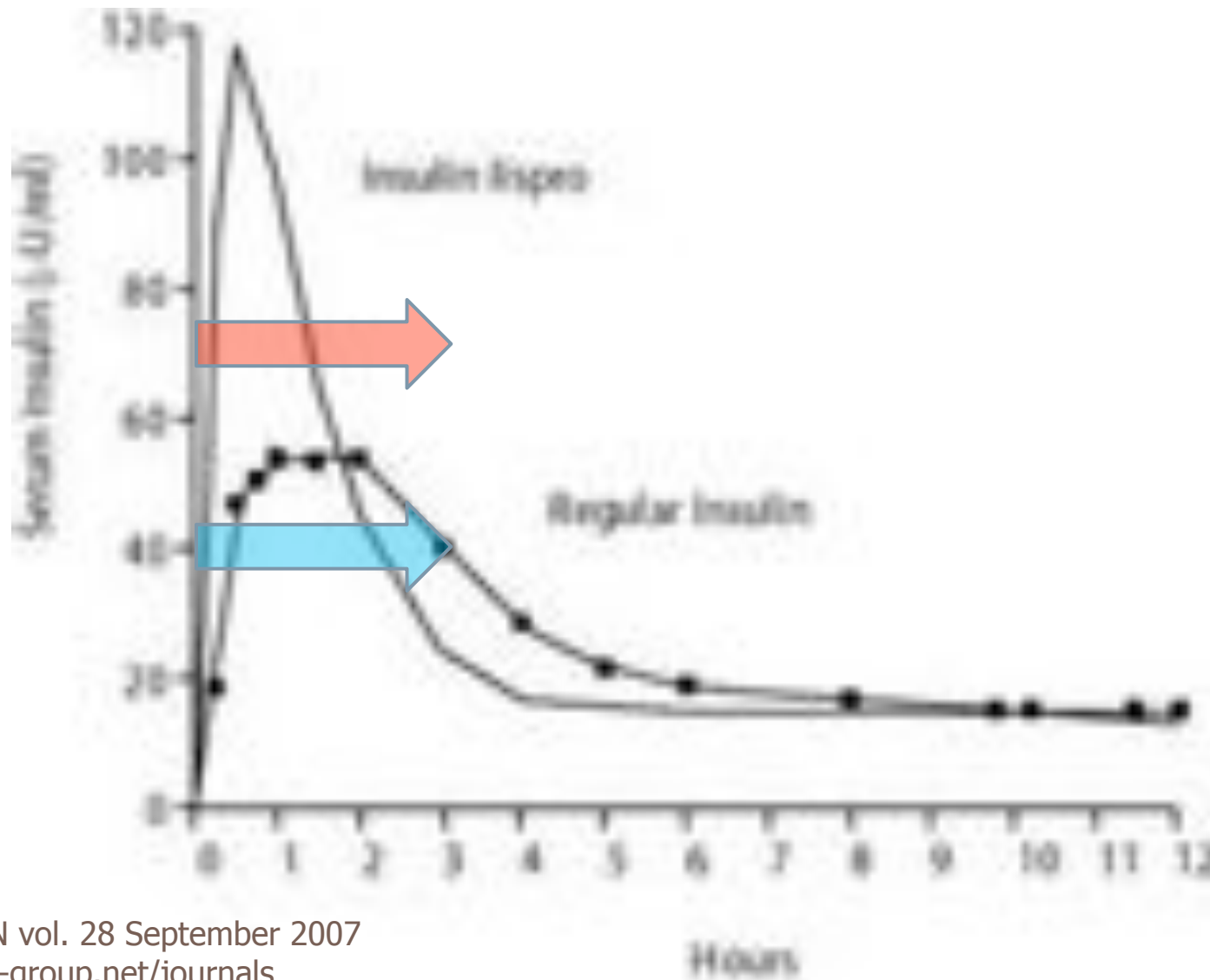
Managing Diabetes in Gastroparesis: Maximize Insulin Therapy

- Timing of meal time insulin
 - ▣ To match gastric emptying
- Type of insulin
 - ▣ To improve ability to match gastric emptying
- Amount of insulin
 - ▣ May need to split dose to deliver correction before the meal and carb coverage after the meal
- As symptoms improve, insulin needs and timing may change as carbohydrate absorption becomes more predictable

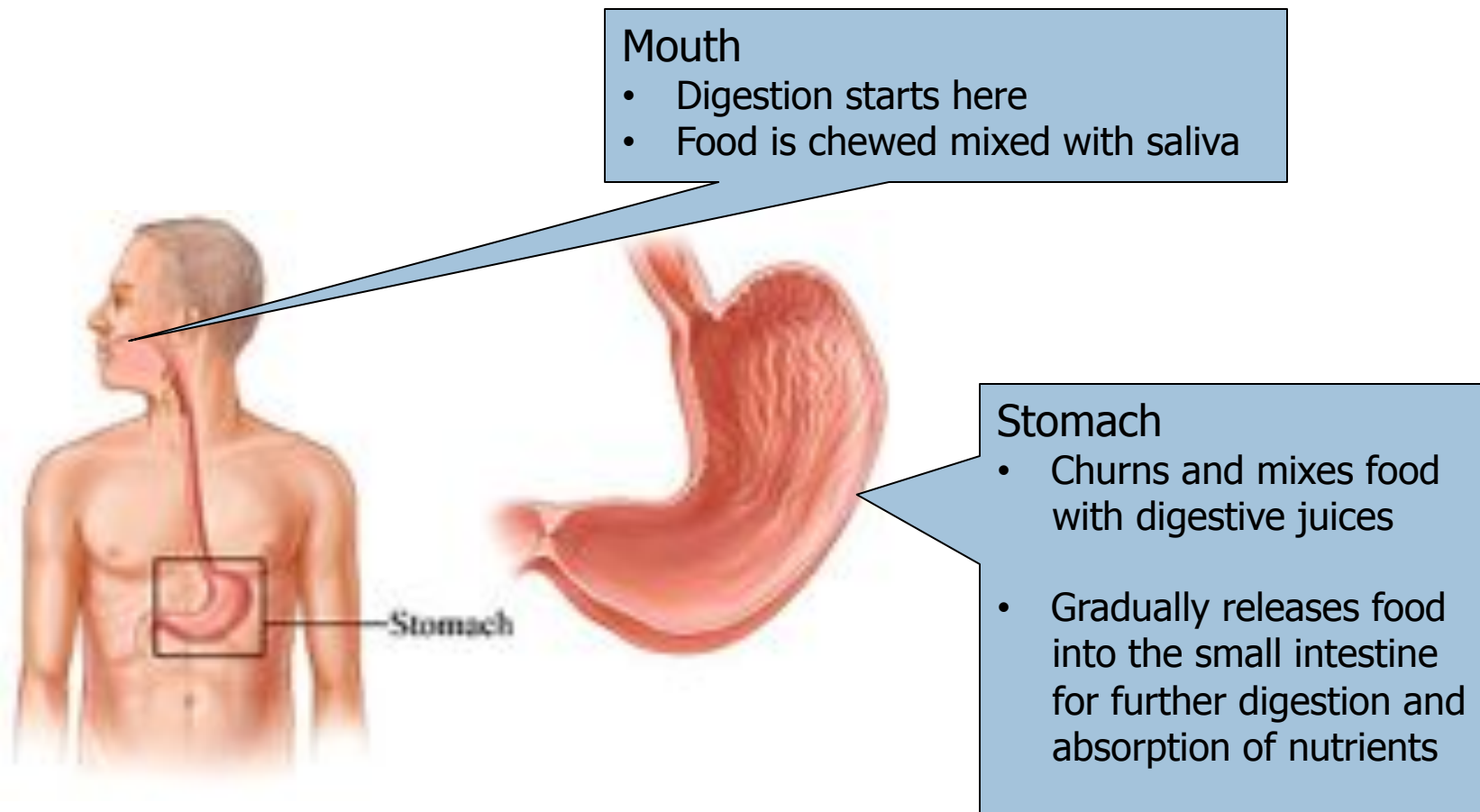
Mealtime Insulin Profiles



3 hr gastric emptying time
insulin taken at time of meal



Managing Gastroparesis with Diet



Managing Gastroparesis with Diet



Diet changes

- ❑ Changes help manage symptoms.
- ❑ Diet changes may also help improve blood glucose

Dietary factors affecting gastric emptying:

- ❑ Volume
- ❑ Liquids versus solids
- ❑ Processing of foods
- ❑ Fat
- ❑ Fiber

Managing Gastroparesis with Diet:

Key Factors Affecting Gastric Emptying

□ Volume

- ▣ The larger the volume of food at one time, the slower the stomach empties
- ▣ Eating small amounts frequently can help the stomach empty more easily



Managing Gastroparesis with Diet:

Key Factors Affecting Gastric Emptying

Liquids versus solid food

- ❑ In gastroparesis the stomach is not able to grind up solids efficiently and contractions that empty the stomach are slowed or absent
- ❑ Liquids empty by gravity - contractions are not required
 - ▣ Even **high fat liquids** empty from the stomach
- ❑ Pureed foods empty easier than solids
 - ▣ Consider solids in the morning when digestion is strongest
 - ▣ Liquids later in the day to help stomach empty better



Diet: Key Factors Affecting Gastric Emptying

□ Fat

- ▣ Slows down gastric emptying
- ▣ Fried and greasy foods can make digestion worse
- ▣ But - many people with gastroparesis can tolerate fat in liquid form
 - Milk shakes
 - Whole milk

Managing Gastroparesis with Diet:

Key Factors Affecting Gastric Emptying

□ Fiber

- Can slow gastric emptying
- Especially a type of fiber called **pectin**
- Fiber is poorly digested and increases risk of forming a **bezoar**

Dietary Recommendations for Gastroparesis:

The “opposite” diet



Diet recommended for gastroparesis is different from usual diet for diabetes

- ☐ Low fiber
- ☐ Low fat
- ☐ Low volume
- ☐ Avoid CATS- caffeine, alcohol, tobacco, and stress
- ☐ Avoid chewing gum (increases air swallowing)

Dietary Recommendations for Gastroparesis



Fiber

- ☐ Easily digestible foods
- ☐ NO raw fruits/vegetables/ whole grains
- ☐ “White” foods are OK- bread, rice, mashed potatoes
- ☐ **Over-the-counter fiber/bulking laxatives should be stopped**
 - ☐ Metamucil, Citrucel, Perdiem, Benefiber and Fibercon
- ☐ Low fiber diet is recommended: 10-15 grams fiber per day
- ☐ **Take supplements if needed:**
 - ☐ Iron, vitamin B 12, vitamin D and calcium
 - ☐ Liquid forms of vitamins and minerals are available.

Dietary Recommendations for Gastroparesis

Fat

- ❑ Avoid fried foods
- ❑ Avoid heavy, high fat meals
- ❑ Liquid fats are OK as they will empty from the stomach by gravity



Dietary Recommendations for Gastroparesis

Volume

- ❑ Eat smaller amounts, more often.

Try liquids or pureed foods:

- ❑ If solid foods cause increased symptoms, try liquid/pureed foods to help the stomach empty easier.
- ❑ If symptoms increase over the course of the day, try solid food in the morning and have liquid meals later in the day.
- ❑ Chew foods well.
- ❑ Sit up during meals and for 1-2 hours after meals.



Complications of Gastroparesis



- Bezoars
- Small Intestinal Bacterial Overgrowth (SIBO)
- Unintentional weight loss
- Malnutrition

What is a bezoar?

- Undigestible food or drugs form into a clump or ball in the stomach.
 - ▣ Like a “hairball” that cats can get
- Bezoars can be small, or they can fill the entire stomach.
- For example, fiber found in fruits and vegetables may form bezoars



High Fiber Foods and Fiber Medications Associated with Bezoar Formation

High Fiber Foods

- Legumes/dried beans
- Bran/whole grain cereals
- Fruits_ (dried fruits, prunes*, all berries*, oranges, apples*, kiwi, coconut*, persimmons*)
- Vegetables_(green peas, broccoli, brussel sprouts*, green beans* corn*, potato peels*, sauerkraut*, tomato skins*)

High fiber medications/ bulking agents

- Acacia fiber
- Benefiber
- Citrucel
- FiberChoice
- Fibercon
- Konsyl
- Metamucil
- Perdiem

*Fiber, peels or skins on these foods are more likely to contribute to bezoars.

Complications: SIBO



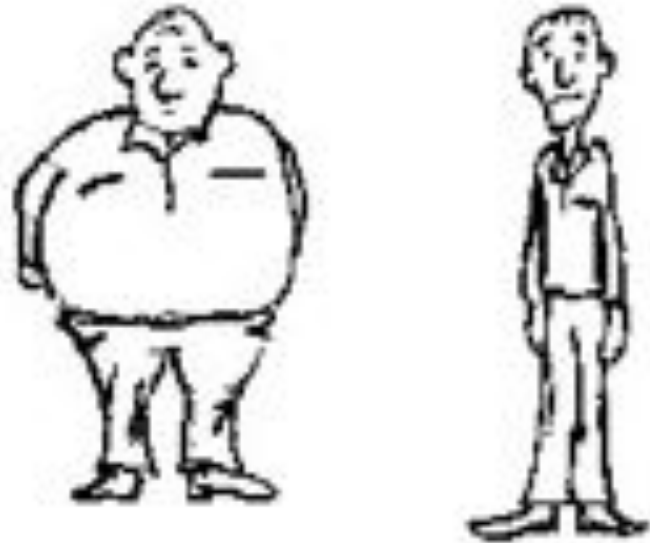
SIBO – Small Intestinal Bacterial Overgrowth

- ▣ Fermentation of undigested food
- ▣ Symptoms include gas and bloating
- ▣ Diagnosed with lactulose breath testing
- ▣ Easily treated with antibiotics

Complications:

Unintentional Weight Loss

- BMI < 20
- 5 pounds weight loss in one month without trying
- 10 pounds weight loss in 6 months without trying



Complications: Malnutrition



- ❑ Not eating enough protein
- ❑ Not eating enough fat
- ❑ Not eating enough!
- ❑ Related to nausea, vomiting, and poor absorption of nutrients

Malnutrition



- Problems chewing or swallowing
- Changes in usual diet
 - ▣ Eating less
 - ▣ Limiting foods
 - ▣ Skipping meals
- Food intolerance or allergies

Nutrients of Concern

Nutritional Labs

Iron-Deficiency Anemia

- ▣ Iron-deficiency anemia is common
- ▣ **Iron absorption requires gastric acid**
- ▣ Ferritin level is an accurate indicator of iron stores over time
- ▣ Ferritin should be checked when you are not sick

Treating Iron Deficiency

- ▣ Iron pills can replenish iron stores.
 - Optimal dosing is 200 mg elemental iron daily.
- ▣ 25-50 mg Vitamin C can enhance iron absorption
- ▣ Take iron supplements with food to reduce GI symptoms
- ▣ Eat more iron-rich foods!
 - Beef has the most readily absorbed form of dietary iron

Nutritional Labs



Vitamin B 12

- ▣ Stomach problems cause decreased absorption of Vitamin B12 from food
- ▣ Small Intestinal Bacterial Overgrowth contributes to deficiency
- ▣ Not eating enough foods that are rich in Vitamin B12 can cause deficiency
 - ▣ Meats and foods that are fortified with Vitamin B12 are best sources
- ▣ Symptoms of deficiency are fatigue, chills, numbness in the extremities, dizziness and other neurological symptoms

Nutritional Labs



Vitamin D 25-OH


- ▣ Vitamin D deficiency is common
- ▣ Vitamin D deficiency can contribute to development of osteoporosis
- ▣ Regular DEXA scans recommended
 - DEXA measures bone density
- ▣ No special recommendations for calcium and vitamin D supplementation for gastroparesis.
- ▣ **Many** people need to take Vitamin D supplements to bring levels up to normal.

Tube Feeding



- ▣ Trial of tube feeding into the intestine to bypass the stomach
- ▣ Tube goes from the nose or the mouth to the part of the intestine called the “jejunum”
- ▣ More permanent placement of a tube directly into the jejunum if tube feeding from nose or mouth to jejunum helps
 - “J-tube”

IV Nutrition (TPN and PPN)



- If unable to eat enough and tube feeding does not work, TPN and PPN are options.
 - ▣ Nutrition can be provided through an IV
 - ▣ Rarely necessary for people with gastroparesis



Resources for living with gastroparesis

Low-Fat Blended Food Guide for Gastroparesis

Milk group: Eat 3 or more servings daily (1 cup each)

Non-fat or low-fat chocolate milk, buttermilk, eggnog, or cocoa

Calcium-fortified soy milk, low-fat or non-fat

Low-fat yogurt or pudding may be thinned with non-fat or low-fat milk

Proteins: Eat 3 servings daily (1/2 cup each)

Finely ground or blended meat added to broth to make a liquid

Blend and thin with milk: scrambled egg substitutes or blended cottage cheese

"Junior" baby food meats or casseroles, blended and thinned with milk or broth

Casseroles blended with fat-free gravy or milk

Vegetables and Fruits: Eat 5 or more servings daily (1/2 cup each)

Blended, thinned fruit

Fruit juice

Vegetable or tomato juice

Thinned baby food fruits or vegetables

Steamed vegetables blended with milk or soymilk or low-fat tofu to make cream soup

Starches: Eat 5-6 servings or more daily (1/2 cup each)

Cooked cereal, rice, or pasta blended and thinned with milk or soymilk

Thinned mashed potatoes (mashed real potatoes have more nutrition than instant)

Blended and thinned canned or home-cooked beans (avoid high-fat chili)

Additional Ideas:

- ◆ Avoid using water to thin foods, this will just dilute them. Use milk, soymilk, or fruit juice.
- ◆ Prune juice or 1 Tbsp bran can be added to food to prevent constipation.
- ◆ Canned products (Boost, Ensure, etc) can be used as a mini-meal substitute, but *only* if the fat is 6 grams or less.
- ◆ Remember to keep your fats low, but fat is easier to tolerate in liquids than in solid foods.
- ◆ Take a multiple vitamin for extra insurance.

Cooking Tips

- Wash and rinse the blender or food processor with hot soapy water after every use.
- Try using a hand blender, these are very convenient and easy to clean.
- Cut foods into one inch cubes and remove all pits, skins, or seeds before blending.
- If the food is foamy after blending, heat up the food and stir it slowly.
- Blended foods often taste bland; add extra seasonings or sugar for flavor.
- Choose different colors, temperatures, and garnishes to add interest to your meals.
- Small, frequent meals are better tolerated.
- Blended foods can be frozen in plastic containers or ice cube trays and stored for future use.
- Refrigerated blended foods should be used within 24 hours.
- Carry instant breakfast packets to mix with milk when away from home.
- Pack blended soup or casseroles in a thermos for lunch boxes.
- Make smoothies with milk, protein powder, fruit and sugar or sweetener.

Recipes

Fortified milk (extra protein)

1 cup instant milk power
1 quart 2% milk

Pour liquid milk into a deep bowl. Add dry milk and beat slowly until the powder dissolves. Refrigerate for several hours before serving.

Vegetable-Beef Soup

1 cup mashed potatoes
1 cup milk
1 cup beef broth
1 small jar baby food beef
1 small jar baby food carrots
salt, pepper to taste

Heat all ingredients in a saucepan. Stir until smooth. Serve hot.

Chocolate-Banana Smoothie

Blend 12 oz milk or soymilk with 1 scoop protein powder, 1 banana, and 1-2 Tbsp chocolate syrup. You can also add a little low-fat ice cream to make a shake!

Katie Drink

1/3 cup low-fat yogurt or cottage cheese
1/3 cup gelled jello (any flavor)
1/3 cup fat-free ice cream

Blend and serve cold. Keeps in fridge 3 days.

Apples a la Mode

1/2 cup applesauce
1/2 cup fat-free vanilla ice cream
1/4 cup milk
dash of cinnamon

Put all ingredients in a blender. Blend until smooth, serve warm or cold.

Creamy Vegetable Soup

Steam a favorite vegetable with 1/2 small onion until cooked (try broccoli, spinach, zucchini, green beans, or carrots). Blend with an equal volume of reduced-fat tofu and thin with a little broth, milk or soymilk. Add herbs and salt to taste. Heat and serve.

Hints for Eating with Gastroparesis (Delayed Stomach Emptying)

MEALS

- Eat small meals. Have about 30 grams of carbohydrate per meal. Start with five small meals per day.
- Eating smaller, more frequent meals containing consistent amounts of carbohydrates will help with blood sugar control.
- Avoid large meals! The larger the meal, the slower the stomach empties.

TIMING

- Avoid meals late in the evening or snacks before bed. Do not lie down immediately after eating.
- Take the time to eat. Eat slowly – aim for 30 minutes per meal.
- Try not to “eat on the run”, which makes you eat faster, chew less, and swallow a lot of air. Swallowed air will make you feel bloated and full.

CHEWING AND SWALLOWING

- Take small bites.
- Chew your foods completely. Avoid foods that are not easily chewed, such as broccoli, corn, nuts, popcorn, and seeds (pumpkin, sunflower, poppy seeds, sesame seeds, etc.)
- Try not to swallow extra air. Avoid chewing gum to avoid swallowing air.
- Dental health is always important. When you have trouble emptying your stomach, dental hygiene and health are important to help you chew. Talk to your dentist about your special needs and have your teeth examined and cleaned twice per year.

FAT

- Avoid high fat foods such as fried foods, rich desserts, high fat condiments such as gravy and sauces, and high fat processed foods such as snack items, cookies, crackers, and chips.
- Avoid whole milk, cheeses, and creams, as well as cream cheese, sour cream, cream soups, and large amount of butter or margarine.

FIBER

- With gastroparesis (slowed stomach emptying), fiber doesn't clear out of the stomach well. If fiber is slowed emptying from the stomach, it usually isn't digested well. This undigested food can lead to gas, bloating and cramping.
- Avoid foods high in fiber. See the included list.
- Avoid high fiber medications or supplements. High fiber slows the stomach from emptying.
- Cook foods thoroughly and well. Avoid salads and raw vegetables. Use unsweetened canned fruit or fruits canned in their own juices.

MEAT

- Trim visible fat off of meat, and choose lower fat meats.
- Ground meat may be easier to chew and digest than something like a lean pork chop, roast breast, or a chicken breast.
- If meat is too dry, moisten it with broth.

LIQUIDS

- Liquids empty faster from the stomach than solids. Having fluids with your meal will help the food pass out of the stomach. Have sips of water as you eat.

OVERALL NUTRITION

- Eat nutritious foods without filling up on “empty” calories.
- There may be times you will need to use regular soft drinks or items you normally would avoid because of your diabetes, but check with your diabetes educator first.

POSITION AND MOVEMENT

- Sit up during and after eating for at least one hour. This will help your stomach empty. Do not lie down immediately after eating.
- A gentle walk after eating will also help move food out of the stomach.
- Keep your head elevated on a pillow when sleeping. Elevating the head of the bed 6-8 inches (by putting pillows between the box spring and mattress, or under your head) will help prevent reflux of stomach acid.

OTHER HABITS

- Avoiding caffeine, alcohol, tobacco and stress will help prevent reflux. These things ‘relax’ the connection between the esophagus and the stomach, which can then result in stomach acid refluxing (backing up) into the esophagus. Other things which can relax this connection are peppermint, chocolate, and fat.
- Avoid tight or constricting clothing that fits tightly across the abdomen.
- Ask your doctor about a liquid or chewable multi-vitamin.
- Check your blood glucose levels at fasting, before bed and 2 hours after each meal.
- Weigh yourself twice a week. If you are losing weight, let your diabetes educator know.
- Be sure to follow-up with your diabetes educator, as the number of meals or types of meals you have may need to be adjusted.

Resources

- Gastroparesis and Dysmotilities Association <http://www.digestivedistress.com/>
- **American Motility Society** - www.motilitysociety.org
- Camilleri M, Parkman HP, Shafi MA, Abell TL, Gerson L. (2013), Clinical guideline: Management of gastroparesis. *Am J Gastroenterol* 2013; 108:18-37, doi: 10.1038/ajg.2012.373, published online 13 November 2012.
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- Diet interventions: <http://www.virginia.edu/uvaprint/HSC/pdf/16076.pdf>
- <http://www.medicine.virginia.edu/clinical/departments/medicine/divisions/digestive-health/clinical-care/nutrition-support-team/patient-education/Gastroparesis%20Short%20Tips%207-15-14.pdf>

Gastroparesis: Summary

