Series Editor: Carol Rees Parrish, RD, MS, CNSD

# **Nutrition Intervention in the Patient with Gastroparesis**



Carol Rees Parrish

The patient with gastroparesis presents a unique and challenging problem to clinicians. Not only can symptoms be severely debilitating, but also alterations in nutritional status can be significant. Gastroparesis has many origins; the clinician must be on the lookout for signs and symptoms in patients at risk. This article provides guidelines for assessing the nutritional status of patients with gastroparesis and strategies for treating nutritional issues that arise in this patient population, from oral feeding to nutrition support.

### **Case Presentation**

- 48 y/o female admitted with the following complaints:
  - Nausea/vomiting
  - Poor appetite
  - Weight decreased by 9 kg over past 3 months
- PMH: Type II DM × 18 years, neuropathy, retinopathy, CRI, CAD, HTN, GERD
- Upon further questioning:
  - Wakes up feeling full
  - Early satiety
  - Frequent hypoglycemia after meals
  - Meds include:
    - · Prilosec, Insulin, Metamucil

(continued on page 57)

Carol Rees Parrish RD, MS, Nutrition Support Specialist, University of Virginia Health System, Digestive Health Center of Excellence, Charlottesville, VA.

(continued from page 53)

### WHAT IS GASTROPARESIS?

astroparesis, also known as delayed gastric emptying, gastric stasis, "slow stomach," gastroparesis diabeticorum, diabetic gastropathy or enteropathy, is potentially very devastating. It can wax and wane depending on the underlying etiology. However, once a patient develops it, it does not necessarily progress to an "end-stage" condition requiring nutrition support for life. To the contrary, many refractory patients, who at some point require jejunal feeding tube placement for nutrition support, eventually eat again on their own (1–5).

Although prokinetic agents and antiemetics are front line therapy in the treatment of gastroparesis (6), the purpose of this article is to provide strategies to maintain or restore nutritional status. Review articles and textbook recommendations are available regarding nutrition intervention in gastroparesis; however, evidenced-based support is lacking. Current dietary guidelines have been developed from studies of normal subjects that look at a single parameter and its effect on gastric emptying, presuming that altering these factors will enhance gastric emptying. Although results of these interventions may reach statistical significance, they have little clinical value based on the author's experience with these patients. A review of gastrointestinal (GI) issues, including gastroparesis in patients with diabetes mellitus, is available elsewhere (7-8) as well as a comprehensive review of the factors affecting gastric emptying (9).

### **KEY FACTORS AFFECTING GASTRIC EMPTYING**

The factors listed below are reported to slow gastric emptying. Their clinical significance has yet to be proven in prospective, randomized, controlled trials. Altering one or more of them in combination with prokinetic therapy may help to restore nutritional status. A word of caution, however—a trial of one factor at a time will help identify what is most important to the individual patient in terms of relieving symptoms. Nutrition intervention should not compromise nutritional status—be wary of creating the "perfect" nutrition care plan that is therapeutically correct, but nourishes no one (i.e., no patient will comply with it and iatrogenic malnutrition follows). See Appendix A for foods that may be tried before instituting nutrition support (personal experience of the author)(10).

### 1) Volume (11)

The primary determinant of gastric emptying is volume; the greater the volume, the slower the emptying.

### 2) Liquids Over Solids (9,11)

Liquid emptying is typically preserved in patients with gastroparesis. Patient positioning is also important. In the supine position emptying is most likely delayed due to antigravity effects of lying down and duodenal compression by the spine. As complaints of fullness may increase over the course of the day, a switch to

Table 1			
Medications Known to Delay Gastric Emptying	(6	11	12)

Alcohol (high concentration) Diphenhydramine Nicotine

Aluminum-containing antacids Glucagon Potassium salts
Anticholinergics Interleukin-1 Progesterone
Atropine L-dopa Sucralfate

Beta agonists Lithium Tricyclic antidepressants

Calcitonin Octreotide SSRI's: (Zoloft, Paxil, Celexa, Prozac)

Calcium channel blockers Ondansetron
Dexfenfluramine Narcotics

liquid calories may help. Theoretically, pureed foods will be liquid after mixing with gastric secretions, hence these **should** also be tolerated.

### 3) Medications (6)

Several medications have, as a side effect, delayed gastric emptying and can aggravate gastroparesis (see Table 1). It behooves the clinician to periodically review ALL medications the patient is taking (especially those who have frequent hospital admits and for whom medications may be added or deleted for a multitude of reasons).

### 4) Hyperglycemia (13–16)

Hyperglycemia has been shown to exacerbate symptoms of gastroparesis (glucose > 200 mg%). It may be poor glucose control that drives a patient's symptoms; it also may be the gastroparesis. Regardless, without good control, unpleasant symptoms and further decline in nutritional status will result.

### 5) Fiber (17-21)

Fiber may slow gastric emptying. If a patient has a history of bezoar formation, it would be prudent to limit fiber. Certain foods have been associated with bezoar formation and may need to be avoided; however, there are no controlled trials to date. See Table 3 for a list of these foods. Over-the-counter fiber supplements should also be discontinued. Alternative stool enhancers may be required. Unless a patient has known delayed transit below the pylorus, fiber-containing enteral feedings should be well tolerated.

### 6) Fat (9)

Fat is a potent inhibitor of gastric emptying. However, in the form of liquids fat has been well tolerated by patients in the clinical setting. Perhaps it is the solid food associated with the fat that poses the problem.

### 7) Osmolality (22-24)

Although osmolality has been shown to slow gastric emptying in various subject populations, clinically it is

### Table 2 When to Consider Enteral Access

- Unintentional weight loss > 5-10% of UBW over 3-6 months respectively, if patient is unresponsive to medical therapy
- Repeated hospitalizations for refractory gastroparesis for hydration and/or nutrition and medication delivery
- · Need for gastric decompression

**Note:** Even though a given patient may, on average, maintain their UBW, assess for:

- · History of frequent hospitalizations
- · Diabetic ketoacidosis
- Dehydration
- · Cyclic nausea and vomiting
- · Overall quality of life

Used with permission from the University of Virginia Health System Nutrition Support Traineeship Syllabus (10)

insignificant. Consider that a clear liquid diet, with an osmolality of greater than 1200 mOsm, is the first post-op diet initiated when the stomach is first waking up. Other examples include sherbet with an osmolality of approximately 1225 mOsm; juices are 700 to 950 mOsm. Patients are rarely intolerant to these fluids. Many medications have an osmolality greater than any food or beverage. Metoclopramide, a commonly used prokinetic agent in this patient population, has an osmolality of 5400 mOsm. As mentioned earlier, liquids of any kind are typically tolerated in the setting of gastroparesis.

### FACTORS THAT MAY ALTER INTAKE IN A PATIENT WITH GASTROPARESIS

### **Nausea and Vomiting**

Antiemetics and prokinetic agents are the mainstay of treatment in gastroparesis. It is important, at least initially, that medication doses be scheduled versus "PRN" until symptoms are improved, as "PRN"

(continued on page 60)

### **Nutrition Intervention in the Patient with Gastroparesis**

### **NUTRITION ISSUES IN GASTROENTEROLOGY, SERIES #3**

(continued from page 58)

## Table 3 Summary of Nutrition Intervention in Patients with Gastroparesis

### Summary of Oral Guidelines

- 1. Decrease volume of meals
  - Use smaller, frequent meals
  - Decrease the total volume of TEN infused (by using a more calorie dense product) to meet nutrient requirements
- 2. Use more liquid calories
  - Try solid food meals in the morning, switching to more liquid meals over the course of the day
  - · Chew foods well
  - · Suggest that the patient sit up during and after meals
- 3. Glucose control!
  - If gastroparesis is a result of diabetes mellitus, maximize glucose control
  - Monitor the need to change the timing of, or the overall requirements for insulin in order to have consistent delivery of nutrients with optimal total calories ingested
- 4. Medications
  - Avoid use of medications on Table 1 if possible.
  - Is the patient receiving adequate coverage of antiemetics and prokinetics at least initially?
  - Review and delete any "unnecessary" meds (they can always be added back later)
  - Use standing orders vs "prn" orders
  - Evaluate route and form tablet vs elixir vs intravenous
- 5. Fat
  - Fat in liquids should be tolerated; implement #1-4 above before restricting
- 6. Fiber
  - Is not for "every body. . . "
  - Can be fermented in a "slow" gut by bacteria potentially causing gas, cramping and bloating, and can ultimately aggravate gastroparesis
  - If bezoar formation is a concern, the patient should avoid the following high-fiber foods and medications:
    - Oranges, persimmons, coconuts, berries, green beans, figs, apples, sauerkraut, Brussel Sprouts, potato peels, and legumes.
    - Fiber supplements such as: Metamucil, Perdiem, Benefiber, Fibercon, Citrucel, etc
- 7. Treat bacterial overgrowth if suspected/symptomatic
- 8. Monitor and replace as needed: Iron, B12, vitamin D, calcium

**Note:** If patient has gastric intolerance to iron, try smaller doses; some is better than none

orders are often missed for various reasons. From a clinical perspective, if the patient does not respond to therapy, review all medication orders for "PRN" (vs standing, elixir or tablets). Finally, if a patient requires gastric decompression concurrent with jejunal nutrient infusion, verify that medications are given via the jejunal port vs. the gastric decompression port.

### Ileal Brake (25)

The ileal brake is the primary inhibitory feedback mechanism that acts to control the transit of a meal through the gastrointestinal tract. This gut "traffic brake" regulates the speed of luminal contents in the GI tract to maximize assimilation of nutrients. The end products of nutrient digestion, which escape the more proximal absorption in the GI tract, such as fatty acids, activate the ileal brake. Clinically, this may unfold as an increase in symptoms of nausea and vomiting after the initiation of jejunal feedings.

### **Bacterial Overgrowth**

In addition to the propulsion of food along the GI tract, peristalsis prevents the colonization of bacteria in a segment of the bowel where it does not belong, namely, the small bowel. Where gastroparesis and other dysmotilities of the GI tract are found, bacterial overgrowth follows. Symptoms may be similar to those of gastroparesis and hence overlooked (26). A course of an appropriate enteral antibiotic is the treatment of choice. Unfortunately, some patients with dysmotility may experience chronic bacterial overgrowth and need antibiotics on a rotating basis. Finally, ileal braking may be triggered as the gut bacteria degrade foodstuffs, allowing some to escape absorption that would normally occur in the proximal small bowel. An upcoming article will be devoted solely to the topic of bacterial overgrowth and nutritional ramifications.

### **NUTRITION INTERVENTION**

### **Nutrition Assessment**

The most important determinant in assessing the nutritional status of a patient with gastroparesis is weight change over time. An unintentional 5% loss of usual body weight over a three-month period is cause for concern. It should be noted that in a patient with diabetes mellitus, it is important to use a hydrated weight as these patients can present with significant weight loss on admission only to return to a normal or near-normal weight once adequately hydrated.

A glycosylated hemoglobin is a useful parameter in a patient with diabetes who reports a considerable weight loss. If elevated, it may be that improved glycemic control will attenuate the gastroparesis, but it also may be the gastroparesis that has wreaked havoc on the glucose control. Regardless of which came first, glycemic control will be an important part of the treatment plan in patients with gastroparesis and diabetes mellitus.

A baseline ferritin level in a non-acute phase setting is worth obtaining as iron deficiency can be a problem in these patients for several reasons, not the least of which is inadequate iron intake. Depending on the underlying etiology of the gastroparesis, low acid states may play a role in altering maximal utilization of this nutrient in addition to anatomical changes in those patients with prior gastric surgery.

Finally, patients who have had a sub-total gastrectomy will have an accelerated loss of bone, putting them at a higher risk for osteoporosis. A 25-OH vitamin D (not 1, 25-OH vitamin D) and a bone mineral density may be beneficial in this sub-group of patients with gastroparesis.

### **NUTRITION SUPPORT**

### **Total Parenteral Nutrition (TPN)**

Should a patient with gastroparesis require nutrition support, TPN is rarely necessary if a feeding tube can

# Table 3 (continued) Summary of Nutrition Intervention in Patients with Gastroparesis

### **Nutrition Support Summary Guidelines**

- 1. If needed, use enteral over parenteral; preferably jejunal feedings
- 2. Use standard, polymeric formulas
- 3. If patient is gastrically-fed, decrease the total volume of TEN infused (by using a more calorie dense formula) to meet nutrient requirements
- 4. Keep patient NPO during initiation of TEN to avoid clouding the issue of oral intolerance with potential TEN intolerance
- 5. If patient experiences an increase in symptoms of nausea/vomiting after initiation of TEN, try decreasing the TEN rate for a couple days
- 6. Maximize the use of prokinetic agents and anti-emetics
- 7. If bacterial overgrowth is a chronic problem, try a non-fiber-containing formula
- 8. Ensure medications are reaching their target: for example, gastric delivery in a patient requiring gastric decompression will be ineffective
- 9. If nausea and vomiting symptoms increase after placement of surgical j-tube and ileus is ruled out, contrast from above can determine if the j-tube balloon is obstructing the lumen. If so, decrease the volume of saline in the balloon to alleviate the mechanical obstruction

Used with permission from the University of Virginia Health System Nutrition Support Traineeship Syllabus (10)

be placed beyond the pylorus. The exception may be in a patient with significant malnutrition and a lengthy GI work-up ahead. Multiple days of NPO at midnight will leave little time for actual infusion of nutrients on any given day.

### **Enteral Nutrition (TEN)**

TEN is less expensive and associated with fewer infectious complications than TPN. It is also less labor intensive for patient and caregiver in the home setting. Enteral access may keep these patients out of the hospital, as they are able to continue hydration, medication, and nutrient delivery via jejunal access.

Ideally, it would be nice to try a patient on nasoduodenal, or better yet, nasojejunal feeding prior to placement of a more permanent enteral access. The drawback is that both of the aforementioned tubes can migrate back into the stomach or become dislodged during a bout of emesis and should be used for short

term only. If a patient requires multiple tube replacements, compare the burden of reinserting multiple tubes along with x-ray confirmation or fluoroscopic placement to moving forward and placing a more permanent enteral access.

Percutaneous endoscopic gastrostomy-jejunostomy (also known as: Jet-PEG or PEG/J) has the benefit of gastric decompression while infusing jejunal feedings concurrently. Hydration and medication delivery are also allowed to continue. If a PEG/J is to be used, this author suggests using a 24 Fr PEG in order to accommodate a 12 Fr jejunal extension in an effort to decrease clogging potential. Although often used, a direct percutaneous endoscopic jejunostomy (PEJ) (27) or surgical jejunostomy tube does not allow for gastric venting if needed. Of note, more than one patient has exhibited an increase in symptoms of nausea and vomiting after surgical J-tube placement only to discover a mechanical obstruction caused by overinflation of the internal balloon of the j-tube. Table 2 provides suggested criteria for when to consider enteral feedings in this patient population.

### **FORMULA SELECTION**

Volume is the most important determining factor when it comes to gastric emptying. In the event new or mild gastroparesis presents itself in a hospitalized patient requiring TEN, switching to a more calorically dense formula will provide more calories at a lower flow rate. Decreasing the total volume needed to meet nutrient needs may be all that is needed to allow continued gastric feeding while avoiding a trip to fluoroscopy or endoscopy for transpyloric tube placement.

The majority of patients will tolerate standard, polymeric formulas. It is sometimes thought that if a patient is fed via the jejunum, a predigested, or elemental product is necessary. The significant absorptive area along with pancreatic enzyme and bile salt secretions, well equips the small bowel for performing its function of digestion and absorption (consider that a patient with a total gastrectomy can consume regular foods). For patients with diabetes mellitus, there is no data to warrant the use of the more expensive diabetic formulas (28–31). Finally, patients with end-stage renal disease are allowed a reasonable level of potassium,

### Table 4

Resources for Patients with Gastroparesis and other Dysmotilities of the GI Tract

### **GI Motility Web Sites**

Gastroparesis and Dysmotilities Association (GPDA) www.gpda.net

Association of Gastrointestinal Motility Disorders, Inc. www.agmd-gimotility.org

Cyclic Vomiting Association www.cvsaonline.org (or 614/837-2586)

International Foundation for Functional Gastrointestinal Disorders

www.iffgd.org/

### **Nutrition Support Web Sites**

**ASPEN** 

www.nutritioncare.org

Oley Foundation www.oley.org

Used with permission from the University of Virginia Health System Nutrition Support Traineeship Syllabus (10)

sodium, phosphorus, and volume. Often these patients can tolerate standard products and still stay within the guidelines of their renal diet prescription (as if they were eating orally). Select the least expensive formula that meets the individual patient's needs vs. using a renal formula because the patient has renal disease.

Fiber formulas can be used; however, in patients with bacterial overgrowth, it is possible that if this condition is untreated, fiber formulas may aggravate symptoms (see section on fiber).

### METHOD OF DELIVERY

Initially, continuous infusion is typically used before switching a patient to the higher infusion rate of night-time delivery (cyclic) in preparation for discharge to home. Cyclic infusion is most commonly used at night, especially in the patient who is trying to take some PO during the day. It requires the use of a pump, although

(continued on page 64)

### **Nutrition Intervention in the Patient with Gastroparesis**

### **NUTRITION ISSUES IN GASTROENTEROLOGY, SERIES #3**

(continued from page 62)

in the non-diabetic patient the gravity drip method may be tried.

Intermittent feeding is meant for use with gastric feeding tubes. Some patients with mild gastroparesis may tolerate smaller volumes of a more calorically dense product given over the course of the day.

### CONCLUSION

While gastroparesis can be very debilitating, interventions are available to decrease symptoms, replenish nutrient stores and improve an individual's overall quality of life. Table 3 is a summary of both oral and nutrition support interventions for this challenging patient population. As with any chronic condition, support groups provide an invaluable resource for these patients. Table 4 provides a list of websites available for patients with gastroparesis or other dysmotilities and for those patients who require nutrition support.

### References

- Fontana RJ, Barnett JL. Jejunostomy tube placement in refractory diabetic gastroparesis: a retrospective review. Am Coll Gastroenterol, 1996;91:2174-2178.
- Parrish C, Sanfilippo N, Krenitsky J, McCallum R. Nutritional and global assessment of long-term jejunostomy feeding. [Abstract] In: ASPEN 18th Clinical Congress. San Antonio, Texas: American Society for Parenteral and Enteral Nutrition, 1994:589.
- Shea S, McCallum R, et al. Nutritional status in patients receiving gastric electrical stimulation for gastroparesis. [Abstract] Nutr Clin Pract, 2002;17(1):54.
- 4. Jacober SJ, et al. Jejunostomy feeding in the management of gastroparesis diabeticorum. *Diabetes Care*, 1986;9(2):217-219.
- Devendra D, et al. Diabetic gastroparesis improved by percutaneous endoscopic jejunostomy. *Diabetes Care*, 2000;23(3):426-427.
- Hasler WL. Disorders of gastric emptying. In: Yamada T (ed). Textbook of Gastroenterology 3rd Ed. Lippincott Williams and Wilkins Pub. Philadelphia, PA: 1999;1341-1369.
- Parrish CR. Gastrointestinal Issues in Person with Diabetes. In: Powers M, ed. *Handbook of Diabetes Medical Nutrition Therapy*, 2nd Ed. Gaithersburg, Maryland: ASPEN Publishers, Inc. 1996:618-637.
- Parrish, CR. Nutritional Care of the Patient with Gastroparesis.
   On the Cutting Edge—Diabetes Care and Education Practice Group of the American Dietetic Association. Summer 1999;20:8-13.
- Hasler WL. The Physiology of Gastric Motility and Gastric Emptying. In: Yamada T, ed. *Textbook of Gastroenterology*. 3rd Ed. Philadelphia, PA: Lippincott Williams & Wilkins; 1999:198-202.
- Parrish CR, Krenitsky J, McCray S. Gastroparesis Module. University of Virginia Health System Nutrition Support Traineeship

- Syllabus. Available through the University of Virginia Health System Nutrition Services in January 2003. E-mail Linda Niven at ltn6m@virginia.edu for details.
- Urbin JLC, Maurer AH. The Stomach. In: Wagner HN, Szabo Z, Buchanan JW Eds. *Principles of Nuclear Medicine*. 2nd Ed. WB Saunders; Philadelphia, PA. 1995:916-918.
- Weber FH, McCallum RW. Nausea, vomiting and disorders of gastric emptying. Gastrointest J Club. 1993;2(2):2-11.
- Horowitz M, Harding PE, Maddox AF, et al. Gastric and esophageal emptying in patients with type II (non-insulin dependent) diabetes mellitus. *Diabetologia*, 1989;32(3):151-159.
- MacGregor IL, Gueller R, Watts HD, Meyer JH. The effect of acute hyperglycemia on gastric emptying in man. *Gastroenterology*, 1976;70:190-197.
- McMahon MM, Rizza RA. Nutrition support in hospitalized patients with diabetes mellitus. Mayo Clin Proc, 1996;71:587-594
- 16. Van den Berghe G, Wouters P, Weekers F, et al. Intensive Insulin Therapy in Critically Ill Patients. *NEJM*, 2001;345:1359-1367.
- 17. Emerson AP. Foods high in fiber and phytobezoar formation. *J Am Diet Assoc*, 1987; 87(12):1675-1677.
- Agha FP, et al. Giant colonic bezoar: A medication bezoar due to psyllium seed husks. Am J Gastroenterol, 1984;79:319-321.
- Ahn YH, Maturu P, Steinheber FU, Goldman JM. Association of diabetes mellitus with gastric bezoar formation. *Arch Intern Med*, 1987;147:527-528.
- McIvor AC, et al. Intestinal obstruction from cecal bezoar; a complication of fiber containing tube feedings. *Nutrition*, 1990;6:115-117.
- Schneider RP. Perdiem causes esophageal impaction and bezoars. South Med J, 1989; 82:1449-1450.
- Bury KD, Jambunathan G. Effects of elemental diets on gastric emptying and gastric secretion in man. Am J Surg, 1974;127:59-64.
- Hunt JN, Stuffs DF. The volume and energy content of meals as determinants of gastric emptying. J. Physiol (London), 1975; 245:209-225.
- Stevens C, et al. Impact of carbohydrate (CHO) source and osmolality on gastric emptying rates of liquid nutritionals. [Abstract] J
   *Parenter Enteral Nutr*, 1979;3:32.
- Van Citters GW, Lin HC. The ileal brake: A fifteen-year progress report. Curr Gastroenterol Rep, 1999;1:404-409.
- Cuoco L, et al. Eradication of small intestinal bacterial overgrowth and oro-cecal transit in diabetics. *Hepato-Gastroenterol*ogy, 2002;49:1582-1586.
- Shike M, Latkany L, Gerdes H, Bloch A. Direct percutaneous endoscopic jejunostomies for enteral feeding. *Gastrointest Endosc*, 1996;44:536-540.
- Harley JR, et al. Low carbohydrate with fiber versus high carbohydrate without fiber enteral formulas. Effect on blood glucose excursion in patients with Type II diabetes (Abstract). Clin Res, 1989;37:141A.
- Peters AL, et al. Lack of glucose elevation after simulated tube feedings with a low-carbohydrate, high-fat enteral formula in patients with Type I diabetes mellitus. Am J Med, 1989;87:178-182.
- 30. Craig LD, et al. Use of a Reduced-Carbohydrate, Modified-Fat Enteral Formula for Improving Metabolic Control and Clinical Outcomes in Long-Term Care Residents with Type 2 Diabetes: Results of a Pilot Trial. *Nutrition*, 1998; 14 (6) 529-534.
- Reader DM, et al. Response to isocaloric quantities of enteral feedings in persons with non-insulin dependent diabetes mellitus (NIDDM) (Abstract). J Am Diet Assoc, 1994 (9) Suppl:A-39.

### **APPENDIX A**

### Food Related Tips for Gastroparesis\*

**Purpose:** Foods that may slow stomach emptying are avoided. Foods that are encouraged are listed below. **Principles:** 

- 1. Eat six or more small meals per day; avoid large meals
- 2. Avoid foods high in fat or too much fat added to food
- 3. Chew foods well; solid food, such as meat may be better tolerated if ground or pureed
- 4. High-fiber foods should be avoided because they may cause bezoar formation
- 5. Sit up during and for 1 hour after eating
- 6. Maintain adequate glucose control if patient has diabetes mellitus

### **STARCHES**

Breads	Cereals	Grains/Potatoes	Crackers
White bread	Quick oats (plain)	Rice (plain)	Arrowroot
(including French/Italian)	Grits	Pasta (plain)	Breadsticks
Bagels (plain or egg)	Cream of Wheat	Bulgur	Matzoh
English muffin	Cream of Rice	Barley	Melba toast
Plain roll	Puffed wheat and rice	Potatoes (no skin, plain)	Oyster
Pita bread	Cereals such as:	(all kinds-sweet, yams,	Pretzels
Tortilla (flour)	(Cheerios, Sugar Pops,	etc.)	Saltines
Pancake	Kix, Rice Krispies, Fruit	French fries (baked)	Soda
Waffle	Loops, Special K, Cocoa	,	Zwieback
	Crispies)		

#### MEATS—GROUND OR PUREED

MILATO—GROUND ON FUNELD				
Beef	Pork	Poultry (skinless)	Cheese	
Baby beef	Lean pork	Chicken	Cottage cheese	
Chipped beef	Tenderloin	Turkey (all)	Grated Parmesan	
Flank steak	Pork chops			
Tenderloin	97% fat-free ham	Fish/Shellfish	Other	
Plate skirt steak		(fresh or frozen,	Eggs (no creamed or fried)	
Round (bottom or top)	Wild Game	plain, no breading)	egg white, egg substitute	
Rump	Venison	Crab	Tofu	
	Rabbit	Lobster	Strained baby meats (all)	
Veal	Squirrel	Shrimp		
Leg	Pheasant (no skin)	Clams		
Loin	Duck (no skin)	Scallops		
Rib	Goose (no skin)	Oysters		
Shank		Tuna (in water)		
Shoulder		•		

### **VEGETABLES** (Cooked, and if necessary, blenderized/strained)

Beets	Tomato juice	Carrots	Mushrooms
Tomato sauce	Tomato paste or puree	Strained baby vegetables (all)	Vegetable juice

### APPENDIX A (continued)

Food Related Tips for Gastroparesis\*

### FRUITS AND JUICES (Cooked and, if necessary, blenderized/strained)

Fruits
Applesauce
Banana
Cranberry (sweetened)
Peaches (canned)
Cranberry (low calorie)

Peaches (canned) Cranberry (low calorie) Apple
Pears (canned) Nectars (apricot, peach, pear) Grape
Strained baby fruits (all) Orange-grapefruit Grapefruit

MILK PRODUCTS

(if tolerated) OTHER CARBOHYDRATES SOUPS Fat (if tolerated)

Buttermilk Angle food cake
Yogurt (frozen) Animal crackers
Evaporated milk Custard/pudding
Yogurt (without fruit pieces) Gelatin

Milk powder Ginger snaps

Milk—any as tolerated Graham crackers

Popsicles

Plain sherbet Vanilla wafers Broth Fat (if tolerated Cream cheese

Orange

Papaya

Prune

Bouillon Mayonnaise
Strained creamed soups Margarine
(with milk or water)

Pineapple-orange

Pineapple

BEVERAGES SEASONINGS/GRAVIES SWEETS

Hot cocoa (made with water or milk)

Kool-Aid

Lemonade

Molly McButter, Butter Buds

Gum

Gum

Gum

Gum

Hard candy

Lemonade Molly McButter, Butter Buds Hard candy
Tang and similar powdered products Gatorade Ketchup Lemon drops
Soft drinks Vegetable oil spray Rolled candy (such as Lifesavers)

Coffee Soy sauce Marshmallows
Tea Teriyaki sauce Seedless jams and jellies

Tabasco sauce Vanilla extract Vinegar

....-9

### The following foods have been associated with bezoar\*\* formation and should be avoided:

Apples Figs Brussels sprouts Potato peels Berries Oranges Green beans Sauerkraut

Coconuts Persimmons Legumes

<sup>\*</sup>Used with permission from the University of Virginia Health System Nutrition Support Traineeship Syllabus (10)

<sup>\*\*</sup>A bezoar is a mixture of food residue in a stomach that does not empty well.