



ADVANCING GI PATIENT CARE 2022

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Gastroparesis: Update for 2022

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Disclosures

Lavanya Viswanathan, MD, MS, FACP, Lt Col, USAF

- No relevant financial relationships to disclose.
- The views expressed here do not reflect the views of the United States Air Force or the Department of Defense.

Outline



- Epidemiology
- Pathophysiology
- Diagnosis
- Prognostic indicators
- Management strategies
- Future directions

Common Outpatient GI Diagnoses

Leading Physician Diagnoses in the Ambulatory Setting for Gastrointestinal, Liver and Pancreatic Disorders in the United States, 2014

Diagnosis	Estimated number of annual visits		
	Office Visits	Emergency Department	Total
Abdominal pain	8,565,933	7,906,926	16,472,859
Gastroesophageal reflux disease/reflux esophagitis	5,235,107	325,666	5,560,773
Nausea and vomiting	1,935,544	2,943,220	4,878,764
Diarrhea	2,173,179	800,794	2,973,973
Gastritis and dyspepsia	2,398,740	462,065	2,860,805
Abdominal wall and inguinal hernia	2,548,881	236,684	2,785,565
Constipation	1,746,404	771,058	2,517,462
Hemorrhoids	2,237,642	246,623	2,484,265
Diverticular disease of the colon	1,748,508	172,462	1,920,970
Malignant neoplasm of the colon or rectum ^a	1,621,053	28,852	1,649,905
Cholelithiasis	1,126,944	466,832	1,593,776
Lower gastrointestinal hemorrhage	1,269,312	191,724	1,461,036
Chronic liver disease and cirrhosis ^a	1,003,102	41,934	1,045,036
Ulcerative colitis ^a	935,150	21,953	957,103
Dysphagia ^a	861,769	43,172	904,941
Pancreatitis - acute and chronic ^b	562,048	195,113	757,161

Appendicitis ^u	523,524	212,046	735,570
Hepatitis C infection ^a	709,338	3,643	712,981
Crohn's disease ^a	642,547	42,399	684,946
Irritable bowel syndrome ^u	585,061	18,638	603,699
Benign neoplasm of colon and rectum ^{a, l}	332,191	-	332,191
Barrett's esophagus ^a	274,482	-	274,482
Celiac disease ^{a, b}	190,381	-	190,381
Hepatitis, unspecified ^{a, b}	24,088	9,775	33,863
Total			54,392,507

Source: The 2014 National Ambulatory Medical Care Survey (NAMCS) and the National Hospital Ambulatory Medical Care Survey (NHAMCS), Emergency Department only (<https://www.cdc.gov/nchs/ahcd/index.htm>).
Peery et al. *Gastroenterology*. 2019 Jan;156(1): 254-272.e11.

Regional Prevalence of Gastroparesis in the U.S.

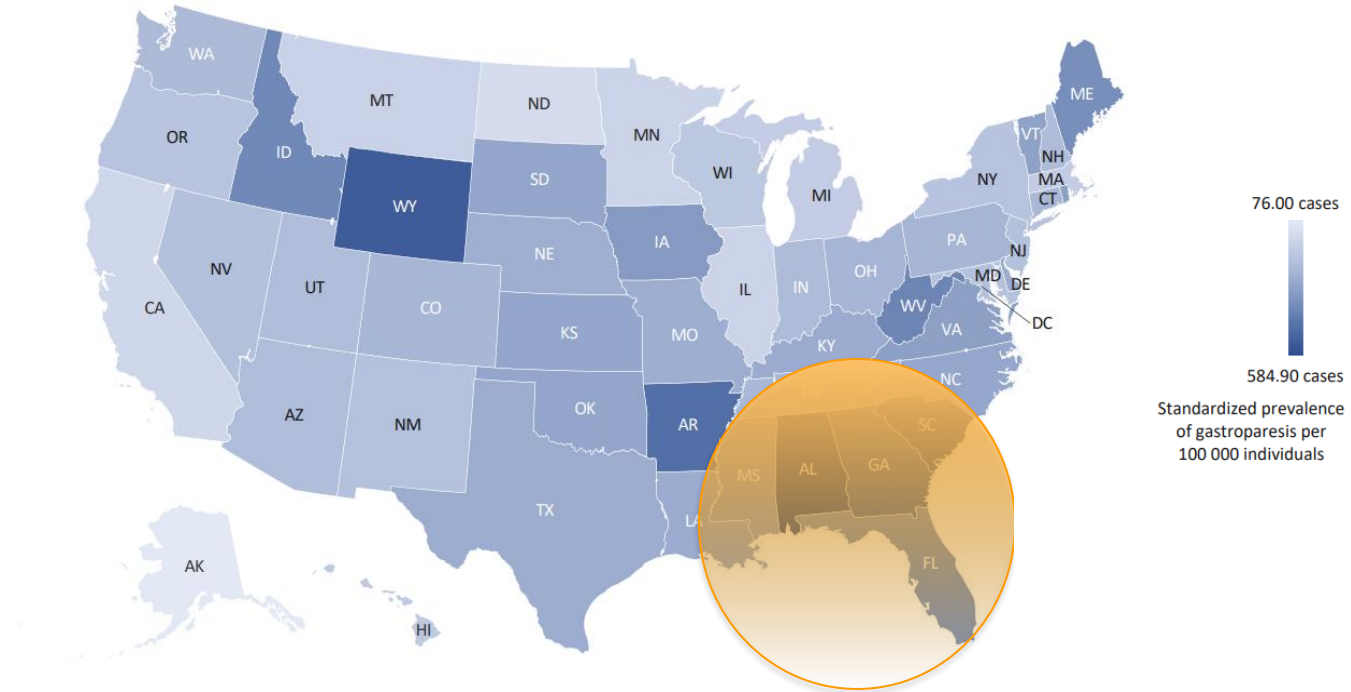
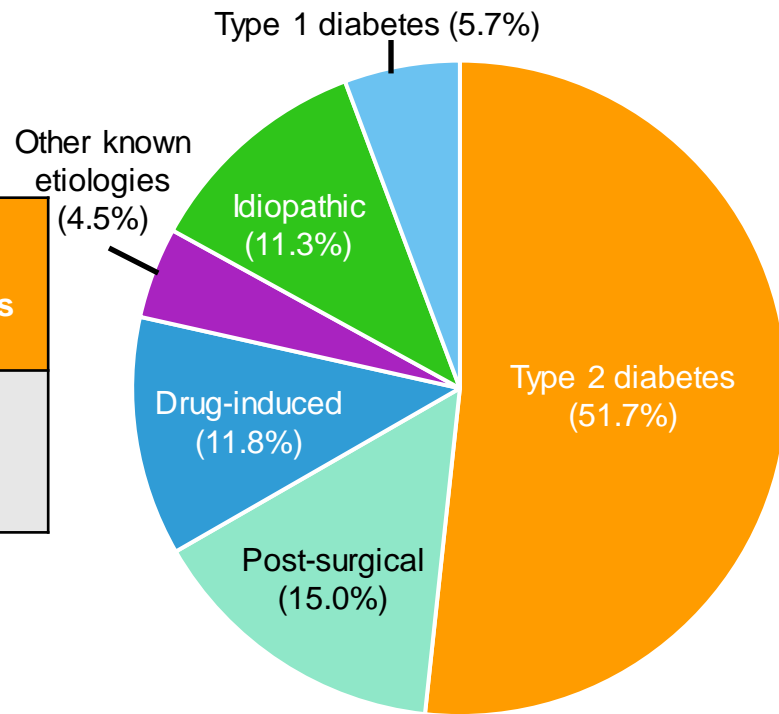


Figure 1. Prevalence of gastroparesis among adults in the United States by state. Prevalence measured by per 100,000 persons and standardized by age and sex.

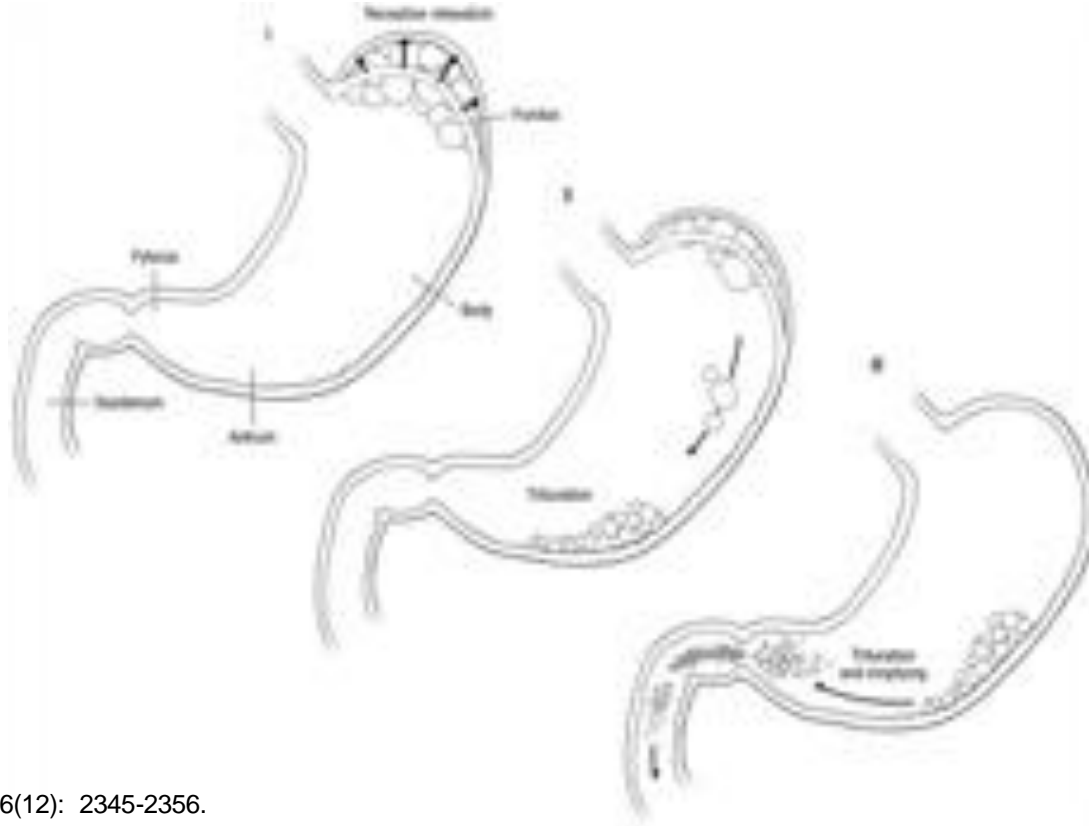
Prevalence Data

Prevalence (95% CI) ^a	Adults with gastroparesis (n=32 010)	Adults with diabetic gastroparesis (n = 13 180)	Adults with idiopathic gastroparesis (n=2543)
Standardized prevalence	267.7 ★ (264.8-270.7)	101.4 (99.7-103.1)	24.8 (23.9-25.8)

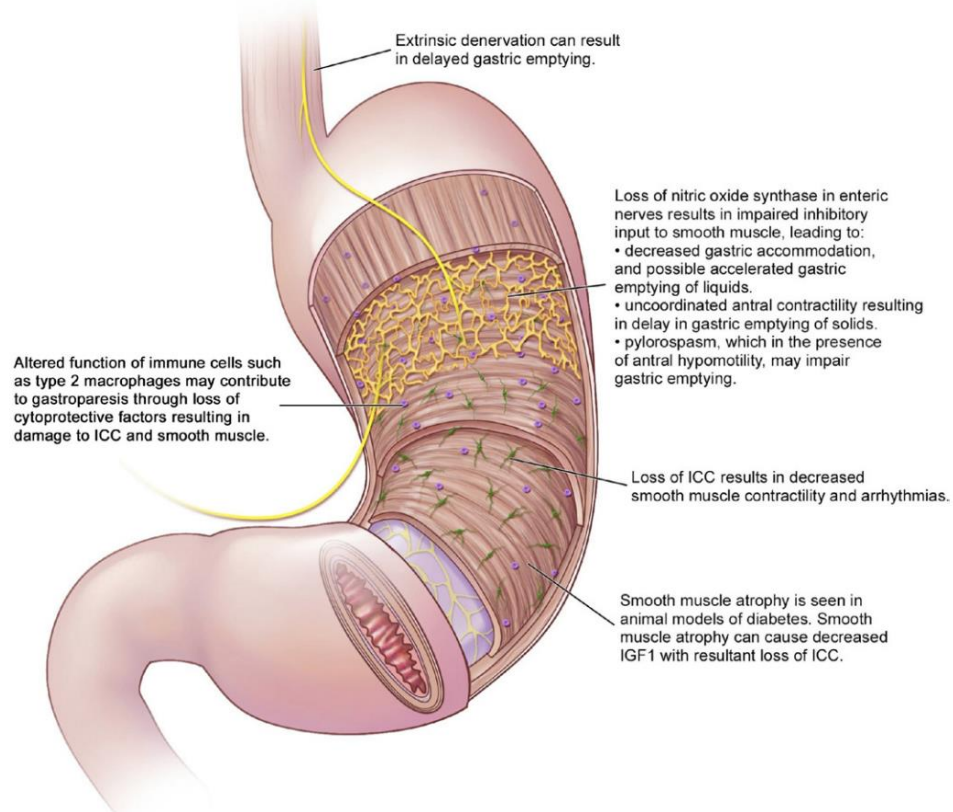


^aPrevalence calculated per 100 000 persons, and standardized by age, sex and geographic region. CI, confidence interval. Ye et al. *Gastroenterology*. 2022;162:109–121.

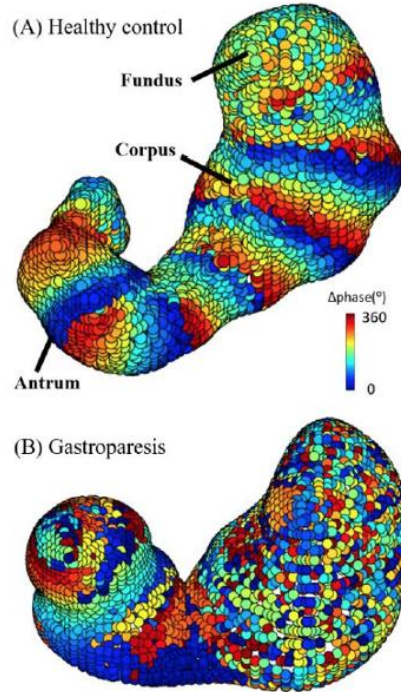
Gastric Response to Ingestion of a Meal – Normal



Gastroparetic Physiology



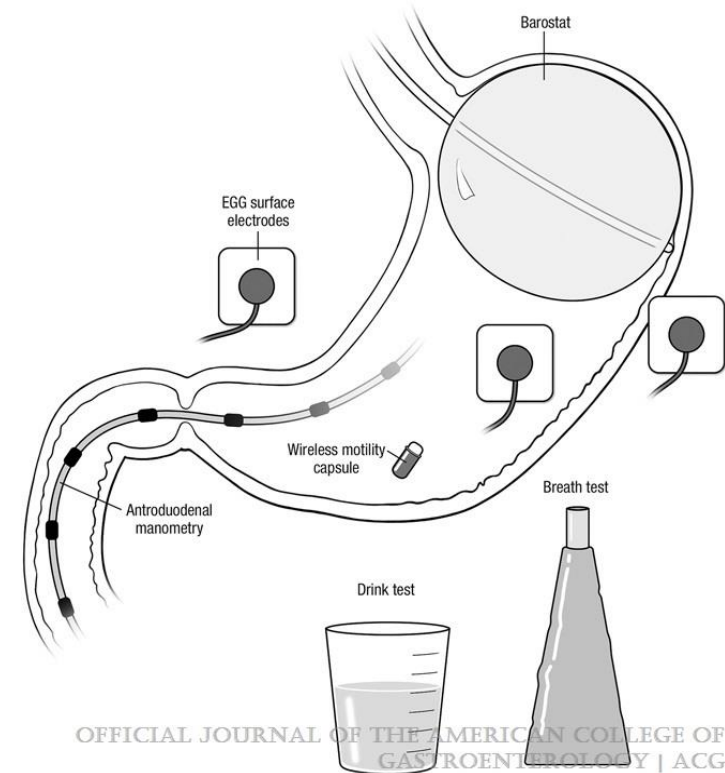
3D MRI: Normal vs. Abnormal



- 15 healthy controls and 10 gastroparetics were given a standardized drink and underwent upper GI MRI scans.
- Healthy controls exhibited bands of slow wave peristalsis (median = 4 wave-fronts; range 3-6) propagating distally at 3.09 ± 0.27 cycles/min.
- The contractile amplitude was stronger in the antrum than in the corpus.
- 5/10 gastroparetic patients displayed large, irregular patches of uncoordinated contractile patterns.

Evaluation of Gastric Motor and Sensory Function

Test	Use	+	-
Gastric emptying scintigraphy (GES)	Gold standard for measuring gastric emptying	Finds out rapid/normal/delayed emptying	Radiation, not compatible with all dietary preferences, standardized protocol not followed everywhere
Breath testing	Acceptable alternative to GES, uses isotope labeled liquids	Non invasive, no radiation, easy	Results altered by malabsorption, pancreatic or pulmonary insufficiency, hepatitis
Wireless motility capsule	Indirect measure of gastric emptying using temperature, pressure and pH sensors	Non invasive, measures pan gut motility, no radiation, gives contractility information, good correlation with GES	Assesses rate of clearance of undigestible material compared to food
Antroduodenal manometry	Consider in patients with unexplained, persistent ongoing symptoms who have failed standard therapy	Identify and distinguish major myopathic and neuropathic disorders	Invasive, limited availability
Gastric barostat	Gold standard to evaluate gastric accommodation	Abnormal GA is common in patients with FD	Invasive, uncomfortable, limited availability



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Masqueraders of Gastroparesis

Structural causes	PUD, SMA syndrome, Celiac artery compression, malignancy
Eating disorder	Avoidant restrictive food intake disorder, anorexia, rumination, bulimia
CNS Etiology	Tumor/occupying lesion
Psychological	Trauma, stressors, depression
Cannabinoid Hyperemesis Syndrome	Cannabis use/other drugs
Cyclic vomiting syndrome	Discrete episodes of nausea/vomiting
Hormonal/endocrine	Endometriosis/other endocrinological abnormalities
Comorbid conditions	Insomnia, POTS, Dysautonomia, IBS, anxiety disorder, pan- GI motility disorder

Functional Dyspepsia and Gastroparesis in Tertiary Care are Interchangeable Syndromes With Common Clinical and Pathologic Features



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Gastroparesis and Functional Dyspepsia

FD: sensory and motor disorder
7-16% prevalence

ROME IV: B1: Functional Dyspepsia

One or more of following: a. Bothersome postprandial fullness b Bothersome early satiation c. **Bothersome epigastric pain** d. Bothersome epigastric burning

AND

2. **No structural disease** (including at upper endoscopy) that explains symptoms.

B1a: Postprandial distress syndrome and/or

B1b. Epigastric pain syndrome

Criteria must be fulfilled for the last 3 months with symptom onset 6 months before diagnosis

Must include one or both of the following at least 3 days a week: 1. postprandial distress severe enough to impact usual activities, 2. early satiation severe enough they can't finish regular-sized meal)

GP: pure motility disorder??
0.01-1.8% prevalence

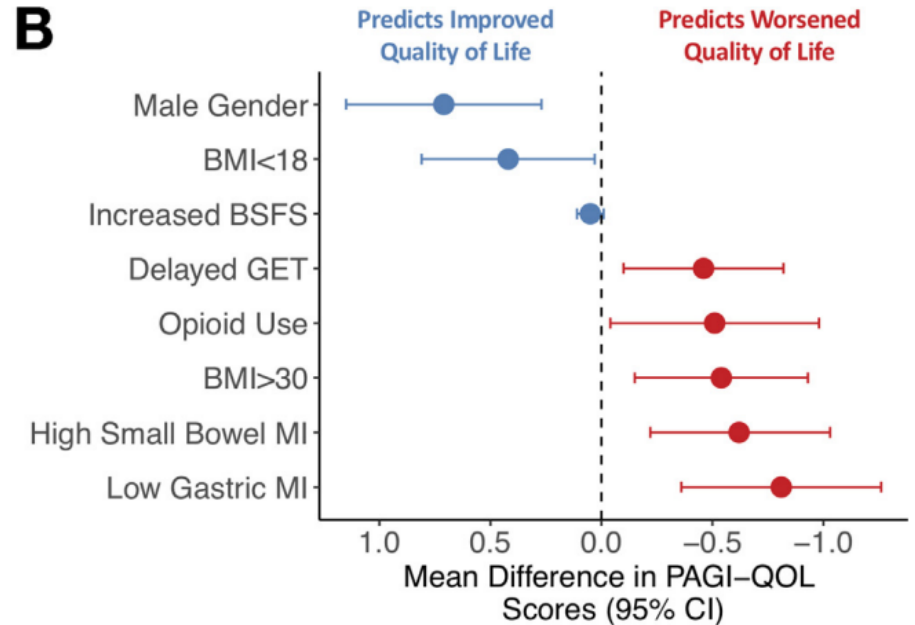
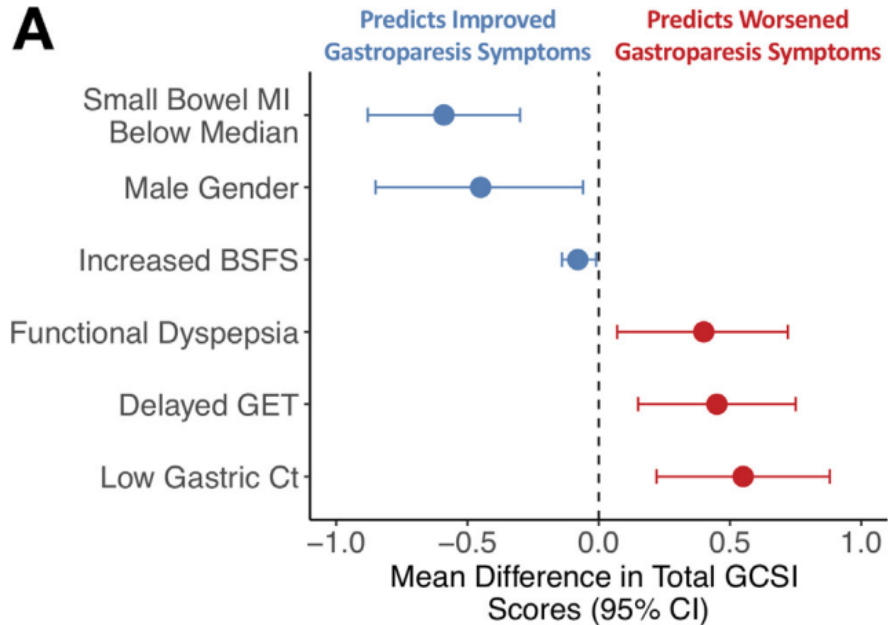
Symptoms >3mo: early satiety, **nausea (90-95%)**, (80-85%), bloating, **vomiting (68%)**, **loss of appetite** and **weight loss** in absence of mechanical obstruction

+ delay in gastric emptying

Abdominal pain (89-90%)

Seen in 25-35% of FD

Positive/Negative Symptom Predictors



Dietary Recommendations

- Low fiber, low fat diet (small particle diet)
- Small, frequent meals
- High protein caloric supplementation (liquids)
- Micronutrient deficiencies are common: vitamin A, B1, B2, B3, B6, B12, C, D and folate
- May require parenteral nutrition, IVF
- Recommend nutrition consultation

Sample Menu

Breakfast

- 1 cup cooked farina (2 carbohydrate servings)
- ½ cup nonfat milk (½ carbohydrate serving)
- ½ cup orange juice (1 carbohydrate serving)
- 1 scrambled egg

Lunch

- 1 cup chicken noodle soup (1 carbohydrate)
- 6 soda crackers (1 carbohydrate)
- ½ cup applesauce (1 carbohydrate)
- ½ cup nonfat milk (½ carbohydrate)

Evening Meal

- 3 oz baked fish
- ½ cup mashed potatoes (1 carbohydrate serving)
- 1 teaspoon margarine
- ½ cup cooked carrots
- ½ cup skim milk (1 carbohydrate serving)
- ½ cup canned fruit, in juice (1 carbohydrate serving)

Morning Snack

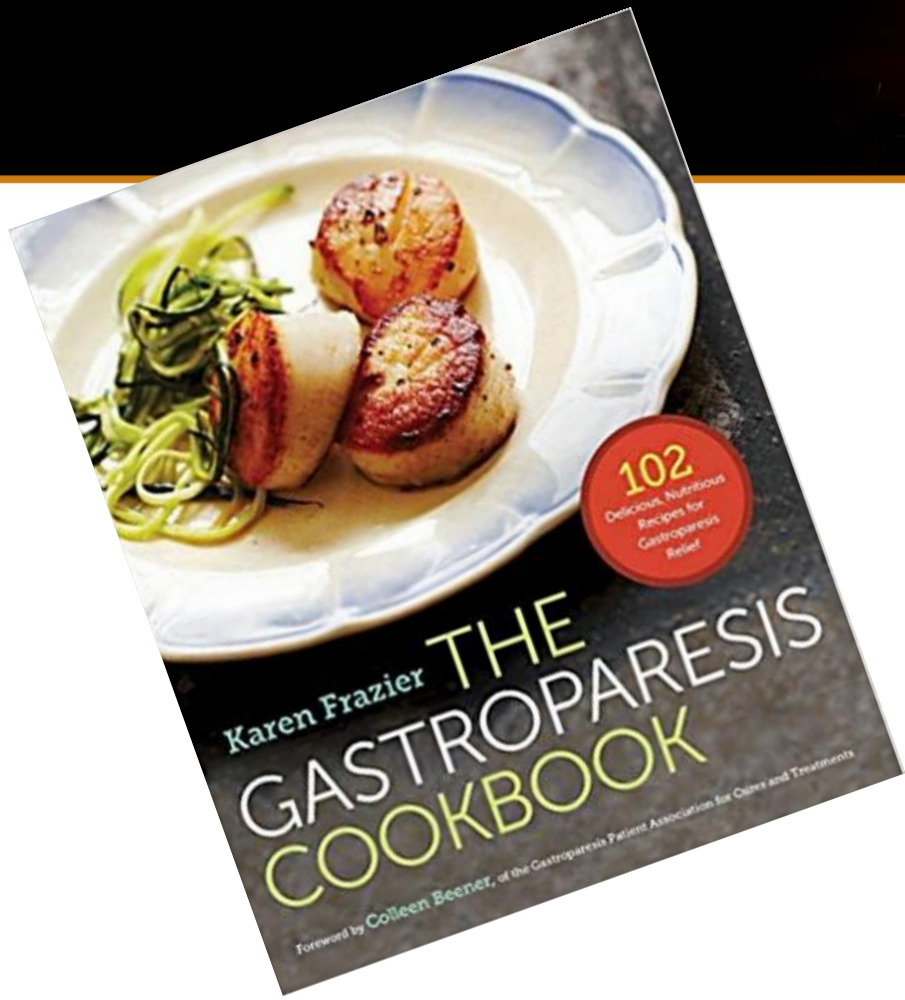
- 1 packet instant breakfast mix (1½ carbohydrates)
- 1 cup skim milk (1 carbohydrate serving)

Afternoon Snack

- 6 oz nonfat smooth yogurt (1 carbohydrate serving)
- 1 small banana (1 carbohydrate serving)

Evening Snack

- ½ cup pudding (1 carbohydrate serving)



Lifestyle Modifications



- Optimize diabetes management
- Consume nutritive solids earlier in the day
- Avoid soda and alcohol
- Avoid any drugs which slow down motility
- PPI can help reflux but can predispose to SIBO
- Sitting upright/walking 1-2h post meal
- Avoid eating 4h before bedtime

Medical Management

- Prokinetics
 - Peripheral cholinergic and central anti dopaminergic agent (**metoclopramide***)
 - Acutely enhances gastric emptying of liquids in diabetic GP
 - Black box warning (0.1%/1000 py → 0.14/100,000py)
 - 10mg po TID, given before meals
 - 10 mg IN spray QID, effective in women only
 - Motilin receptor agonist (**erythromycin/azithromycin**)
 - Enhances antral motility
 - 1.5-3mg/kg TID
 - Tachyphylaxis
 - 5HT₄ receptor agonist (tegaserod, **prucalopride**, **velusitrag**, felcisetrag)
 - Symptom improvement in idiopathic and diabetic patients
 - D₂ receptor antagonist (domperidone)
 - Requires investigational drug application for use
 - 10-20mg TID and at bedtime
 - Risk of QT prolongation, ventricular tachycardia

Medical Management

- Nausea/Vomiting
 - 5HT₃ receptor antagonists (ondansetron, granisetron)
 - Improve nausea and vomiting
 - TD granisetron decreased symptom scores by 50% in refractory patients in an open label trial
 - Regular use can cause constipation
 - NK-1 receptor antagonist (aprepitant, tradipitant, casopitant, rolapitant)
 - Blocks substance P which regulates nausea/vomiting
 - Helps nausea/vomiting even in non GP/FD pts

Medical Management – Visceral Pain

- Abdominal pain is common in medically refractory GP
- Pathophysiology unknown, likely multifactorial
- Neuromodulator use – NORIG trial
 - No significant difference between nortriptyline vs. placebo
- Amitriptyline improved FD symptoms without slowing gastric emptying
- Duloxetine (SNRI) improved diabetic polyneuropathic pain vs. placebo at daily doses of 60–120 mg x12 weeks in RCTs, although nausea or constipation can develop or worsen
- Opioids should not be used

Gastric Electrical Stimulation



- FDA approved for IG and DG
- Indicated for medically refractory GP
- Improves refractory vomiting

Pyloric Interventions

Intrapyloric botulinum toxin injection

- 2 RCT's showing no symptom improvement

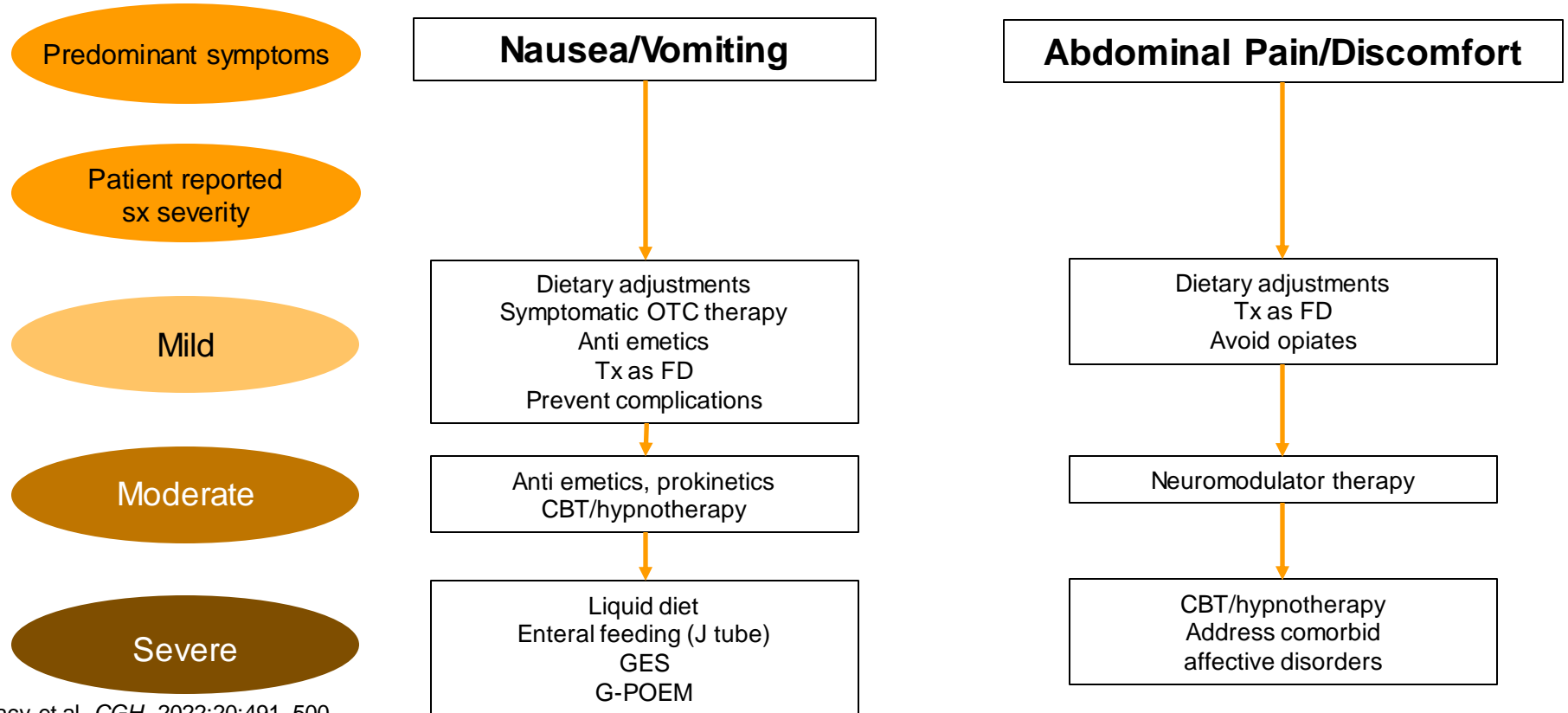
Pyloroplasty

- Cuts both muscle layers
- 3 month f/u – improvement in symptom severity scores and gastric emptying

Gastric Per Oral Endoscopic Myotomy (G-POEM)

- 8 uncontrolled studies, highest n=45, longest f/u= 15mo
- Demonstrates improved gastric emptying
- Lack of RCT's
- Wider pylorus may not help
- Pyloric stenosis, perforation, pneumoperitoneum, dumping

Management Algorithm for Medically Refractory GP



Summary

Cardinal symptoms include nausea, vomiting and pain

Remember to exclude masqueraders

Spectrum of disease with FD

Know how to correctly diagnose

Positive/negative symptom predictors

Firstline pillar of management should include nutrition and lifestyle counseling

Medical management should be tailored according to symptoms

Gastric electrical stimulator helps with nausea in DP

Pyloric interventions show promise



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