ECHO IDAHO

Diabetes and Metabolic Conditions

Diabetes and Gastroparesis: Integrating Nutrition and Medical Strategies

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Roger Turcotte, MD

St. Luke's Internal Medicine

Rachel Myers, MSAN, RD, LD, CDCES, LSSGB

St. Luke's Humphreys Diabetes Center

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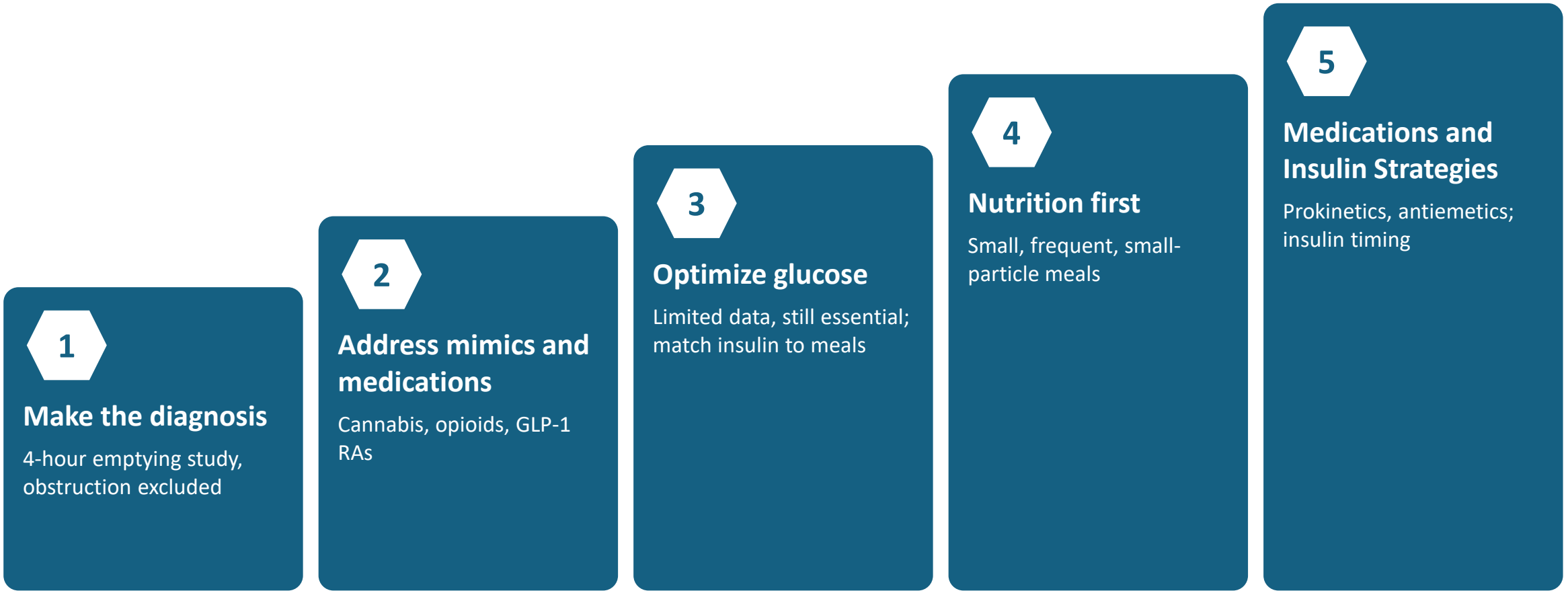
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Learning Objectives

- Learn when to suspect diabetic gastroparesis and how to make the diagnosis
- Describe the relationship between blood glucose and gastric emptying
- Understand nutritional strategies for managing gastroparesis
- Address the role of medication in the treatment of gastroparesis
- Learn strategies for adjusting insulin use

Stepwise Approach

"Treatment of diabetic gastroparesis may be very challenging." — ADA Standards of Care 2026



Step 1: Make the Diagnosis

1

Make the diagnosis

4-hour emptying study, obstruction excluded

2

Address mimics and medications

Cannabis, opioids, GLP-1 RAs

3

Optimize glucose

Limited data, still essential; match insulin to meals

4

Nutrition first

Small, frequent, small-particle meals

5

Medications and Insulin Strategies

Prokinetics, antiemetics; insulin timing

What is Diabetic Gastroparesis?

Definition: delayed gastric emptying without mechanical obstruction

Cardinal symptoms: nausea, vomiting, early satiety, postprandial fullness; also bloating, upper abdominal pain

Suspect it when a patient with diabetes has:

- Upper GI symptoms with no other explanation
- **Erratic glucose**, especially unexplained lows soon after meals
- Long-standing diabetes with other complications (retinopathy, autonomic neuropathy)
- Diagnosis requires typical symptoms and delayed gastric emptying

Most cases: type 2 diabetes

52%

of all gastroparesis is due to type 2 diabetes, the single most common cause

Highest risk: type 1 diabetes

5% vs 1%

10-year incidence in type 1 vs type 2 diabetes (0.2% in people without diabetes)

ADA Standards of Care 2026, Ch. 12; Camilleri, JAMA 2026; Jalleh et al., Endocrinology Today 2023

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Symptoms Don't Predict Emptying

Gastric emptying in people with diabetes and upper GI symptoms

43–52%
Normal emptying

20–37%
Rapid emptying

19–28%
Delayed emptying (gastroparesis)

- **Only about 1 in 4** symptomatic patients actually has delayed emptying
- **About 40%** reclassify between gastroparesis and functional dyspepsia on repeat testing
- Normalizing emptying does not reliably relieve symptoms, which may arise from gastric inflammation and sensory nerves rather than motility
- **Implication:** confirm with an objective test, and set expectations that symptoms and emptying may not move together

Goyal, N Engl J Med 2021 (Table 1); Camilleri et al., ACG guideline 2022; Staller et al., AGA guideline 2025

Gastric Emptying Testing

What to order

- **A 4-hour gastric emptying study** (nuclear medicine)
- **Avoid 2-hour studies**; they miss many cases
- Endoscopy or CT first to exclude obstruction

Before the test

- **Glucose under 275 mg/dL** on the day of the test
- **Hold for 2 days:** opioids, cannabis, nausea and motility medications
- GLP-1 RAs can make the result look delayed

What the result means

Food still in the stomach at 4 hours:

Mild 10–15%

Moderate 16–35%

Severe >35%

Under 10% is normal. A normal result on a GLP-1 RA is reassuring.

AGA 2025; ACG 2022; Camilleri, JAMA 2026; ANMS/SNMMI consensus on gastric emptying scintigraphy

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Step 2: Address Mimics and Medications

1

Make the diagnosis

4-hour emptying study, obstruction excluded

2

Address mimics and medications

Cannabis, opioids, GLP-1 RAs

3

Optimize glucose

Limited data, still essential; match insulin to meals

4

Nutrition first

Small, frequent, small-particle meals

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Medications and Insulin Strategies

Prokinetics, antiemetics; insulin timing

Rule Out Obstruction and Mimics

First exclude obstruction

- Upper endoscopy (or CT): pyloric stenosis, peptic ulcer, malignancy, stricture
- **Retained food on EGD is not diagnostic** (positive predictive value about 55%; opioids and other drugs also cause it)

Then consider the mimics

- Functional dyspepsia (normal emptying)
- Cyclic vomiting syndrome
- **Cannabinoid hyperemesis syndrome**

Ask every patient about cannabis

Cannabinoid hyperemesis syndrome (CHS):

- Stereotyped episodes of vomiting, 3 or more per year
- Cannabis use for over a year, more than 4 times a week
- Relief with hot showers or baths is a classic clue
- Resolves only with sustained abstinence (at least 6 months)

ACG 2022; AGA 2025; Camilleri, JAMA 2026; Rubio-Tapia et al., AGA Clinical Practice Update on CHS, Gastroenterology 2024

Medications That Slow Gastric Emptying

Opioids

Including tramadol. Used by 41% of patients in the NIH gastroparesis consortium, with worse symptoms and more hospitalizations

Anticholinergics and TCAs

Oxybutynin, sedating antihistamines, amitriptyline

Cannabis

Slows emptying and can cause hyperemesis

Pramlintide

Amylin analog; slows emptying by design

GLP-1 RAs and tirzepatide

Common, and often worth keeping (next slide)

GI mimics

Metformin and acarbose cause GI symptoms that can look like gastroparesis

Stopping these may improve symptoms and motility (ADA 2026)

ADA Standards of Care 2026, Ch. 12; AGA 2025; Camilleri, JAMA 2026; Krishnasamy & Abell, Diabetes Ther 2018

GLP-1 Receptor Agonists

4.5×

odds of retained gastric contents at endoscopy

- **Slowed emptying is most marked early** and after dose increases; it attenuates over time but persists, and is similar across commonly used agents
- **Weigh the benefits before stopping** (glycemic, weight, cardiorenal), per ADA
- **New symptoms after starting or increasing the dose?** Reduce or hold, and see whether symptoms resolve before ordering a test
- **Testing on a GLP-1 RA:** a delayed result can't be interpreted; a normal result is reassuring

Camilleri, JAMA 2026 (meta-analysis of 23 observational studies, n = 262,018); ADA 2026; AGA 2025; Hiramoto et al., Am J Gastroenterol 2024

Step 3: Optimize Glucose

1

Make the diagnosis

4-hour emptying study, obstruction excluded

2

Address mimics and medications

Cannabis, opioids, GLP-1 RAs

3

Optimize glucose

Limited data, still essential; match insulin to meals

4

Nutrition first

Small, frequent, small-particle meals

5

Medications and Insulin Strategies

Prokinetics, antiemetics; insulin timing

Does Improved Glycemic Control Help?

Recommended by everyone, proven by no one

Society	What it says	Strength
ACG 2022	Optimal glucose control is suggested to reduce future worsening of gastroparesis	Conditional; low-quality evidence
AGA 2025	"Important to optimize glycemic control"	Ungraded; evidence not reviewed
ADA 2026	Optimize glucose to prevent or slow neuropathy; no gastroparesis-specific statement	A (type 1), C (type 2), for neuropathy

What the data show

- High glucose acutely slows emptying (small studies)
- Long-term HbA1c is linked to delayed emptying (DCCT/EDIC)
- No trial shows that better control reverses it

Why it still matters

- Testing: glucose over 275 mg/dL distorts results
- Pump + CGM pilot: better symptoms and quality of life (n = 45, no controls)
- Slows neuropathy progression (ADA)

ACG 2022; AGA 2025; ADA 2026; Schvarcz 1997; Bharucha 2015 (DCCT/EDIC; CGH); Calles-Escandón, PLoS One 2018

Step 4: Nutrition

1

Make the diagnosis

4-hour emptying study, obstruction excluded

2

Address mimics and medications

Cannabis, opioids, GLP-1 RAs

3

Optimize glucose

Limited data, still essential; match insulin to meals

4

Nutrition first

Small, frequent, small-particle meals

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Medications and Insulin Strategies

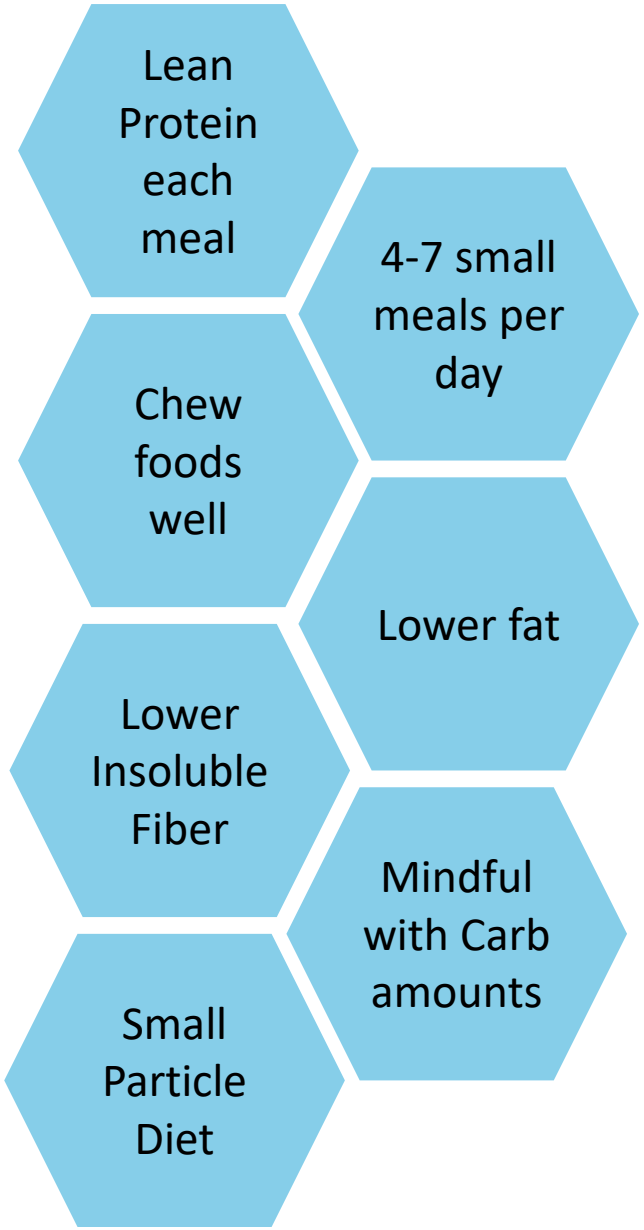
Prokinetics, antiemetics; insulin timing

Nutrition Therapy

- Nutrition is the first-line treatment for this condition and has the strongest evidence for improving symptoms.

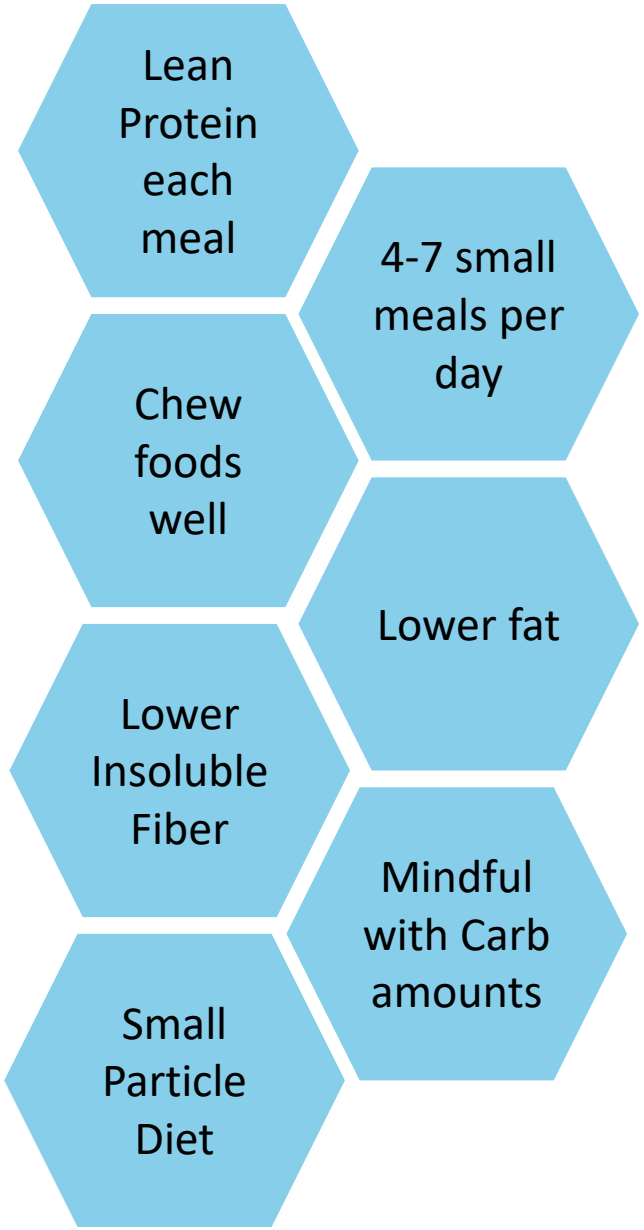


Quick Overview of Nutrition Topics
Small frequent meals
Small particle diet
Reduce dietary fat (when patient is symptomatic)
Reduce Insoluble fiber
Liquid Nutrition
Improve Glucose Management
Nutrition Support Escalation



Tips for your patients:

- Soups, stews and smoothies are your friend! These foods can be better tolerated because of the mechanical or thermal pre-breakdown of the food
- Stew meats over dry cooking methods- Stewed chicken easier to digest than oven baked
- Choose lower fat items most of the time – If eating fat in fluids, the patient may be able to tolerate higher fat (i.e. smoothies with full fat Greek yogurt, or peanut butter or avocado)
- Steam vegetables well – May need to limit raw vegetables
- Sit or stand upright after meals for 1-2 hours (don't lay down)– even better try a walk for 10-15 minutes to help aid digestion after eating.



Tips for your patients, cont:

- Fluid nutrition supplements can help meet gaps when appetites run low.
- Chew foods well- try at least 10 chews per bite
- Small particle means foods that are small enough to pass through the pylorus without excessive grinding

Good Options	Avoid
Cottage Cheese	Whole nuts
Apple sauces	Popcorn
Mashed potatoes	Raw vegetables
Smoothies	Fibrous fruits
Fish or stewed poultry	Steak
Eggs or ground meats	Large salads

Everyone has a Different Journey

Table 2.

Proposed classification of gastroparesis severity

Classification	
Grade 1: Mild gastroparesis	Symptoms relatively easily controlled
	Able to maintain weight and nutrition on a regular diet or minor dietary modifications
Grade 2: Compensated gastroparesis	Moderate symptoms with partial control with pharmacological agents
	Able to maintain nutrition with dietary and lifestyle adjustments
	Rare hospital admissions
Grade 3: Severe gastroparesis	Refractory symptoms despite medical therapy
	Inability to maintain nutrition *via* oral route
	Frequent emergency room visits or hospitalizations

- Recommend referral to dietitian **at diagnosis** of gastroparesis **and periodically** as the patient's symptoms change.

- Grade 3: Severe gastroparesis usually requires enteral or parenteral nutrition for patient to meet needs.

What About Carbohydrates?

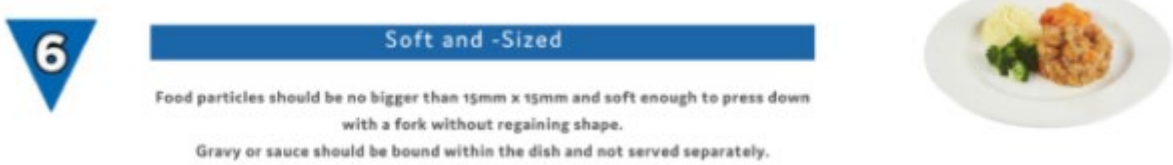
- There is no defined exact carbohydrate goal for a patient with gastroparesis.
- However, high glucose worsens the patient's symptoms and the condition.
- Recommendations are to balance blood glucose levels by choosing moderate amounts of carbohydrates spread out across the day in the small meals.

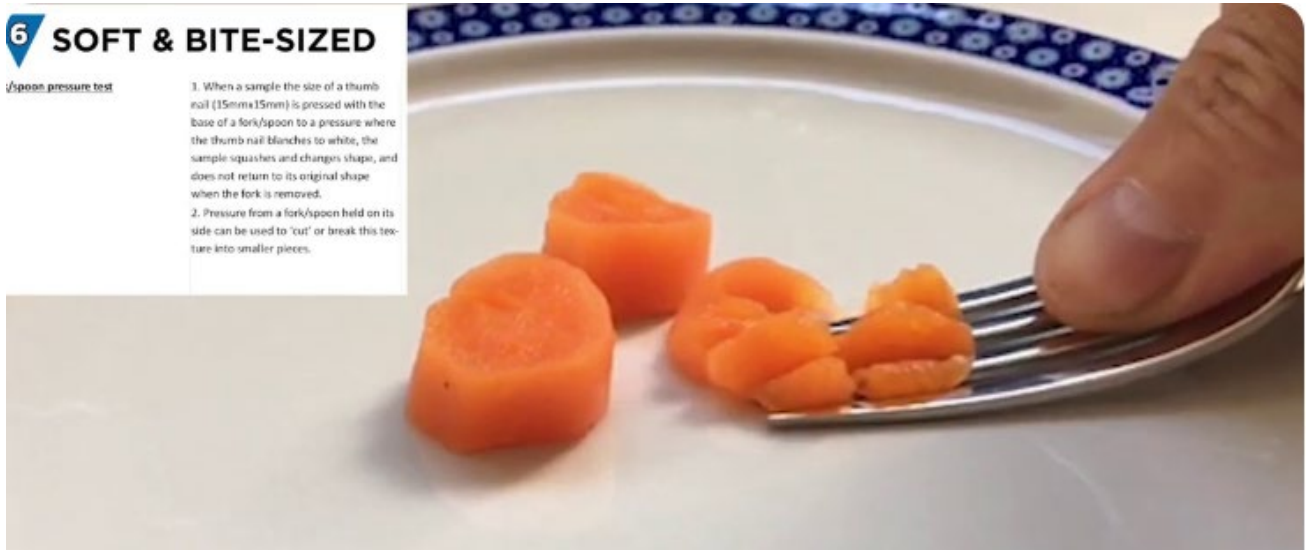




Small Particle Size?

- Many patient symptoms improve when small particle diets are consumed.
- Consider smaller diced/minced foods which can easily be broken smaller with fork tines as shown below.





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https://my.clevelandclinic.org/health/treatments/full-liquid-diet

Full Liquid Diet?

- If improvements do not occur with small particle, low fiber diet then full liquid PO diet is an opportunity while symptomatic (should usually be short term). Advance the diet back to small particle as tolerated.
- Many Challenges:

-Patient satisfaction

-Blood glucose control

-Nutrition is often not met

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Enteral or Parenteral Nutrition?

- When might we consider alternate than PO nutrition?

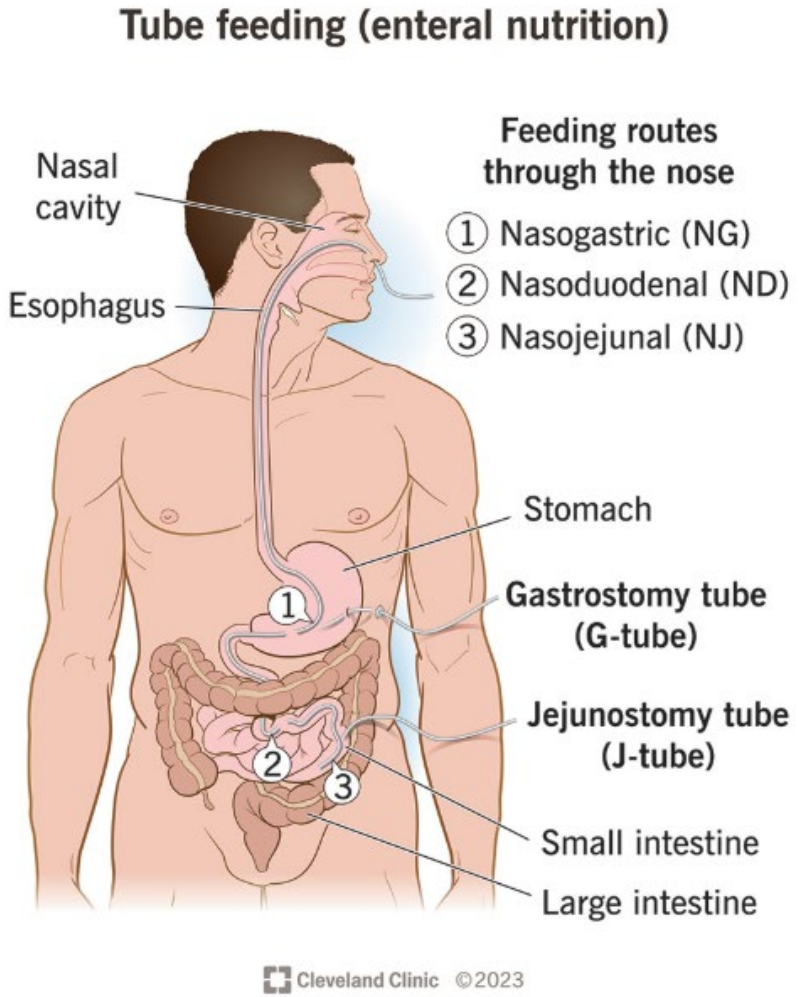
-Noted malnutrition risk

-Unintentional weight loss of >5% of body weight in 3 months or >10% in 6 months)

-Failure to gain weight when underweight from previous weight loss

-Frequent hospitalizations for dehydration/persistent vomiting

-Symptomatic with very poor quality of life



https://my.clevelandclinic.org/health/treatments/21098-tube-feeding--enteral-nutrition

Nutrition Wrap Up



- This is a challenging condition!
- Food is deeply personal to most people and in this condition, they can feel like they can't eat anything.
- Dietitians can truly help bridge the gap between a patient's normal diet and what helps minimize symptoms and improve quality of life.

Step 5: Medications and Insulin Strategies

1

Make the diagnosis

4-hour emptying study, obstruction excluded

2

Address mimics and medications

Cannabis, opioids, GLP-1 RAs

3

Optimize glucose

Limited data, still essential; match insulin to meals

4

Nutrition first

Small, frequent, small-particle meals

5

Medications and Insulin Strategies

Prokinetics, antiemetics; insulin timing

Medications: Only If Needed

Drug	How to use	Cautions
Metoclopramide (AGA: conditional)	Start 5 mg before meals, up to 10 mg; or nasal 15 mg before meals and at bedtime. Reassess at 4–8 weeks; drug holidays are an option	Boxed warning; avoid beyond 12 weeks. Tardive dyskinesia likely <1%, about 1 in 1,000; higher risk in older adults and with psychotropics
Erythromycin (AGA: conditional)	40–150 mg liquid, 30 min before meals; 3 weeks on, 1 week off	Tachyphylaxis; QT prolongation; CYP3A interactions. Azithromycin is used similarly
Antiemetics	Ondansetron, promethazine, prochlorperazine as needed	Relieve nausea but do not speed emptying

Not first-line (AGA): domperidone (now essentially unavailable in the US), aprepitant, nortriptyline, buspirone, CBD

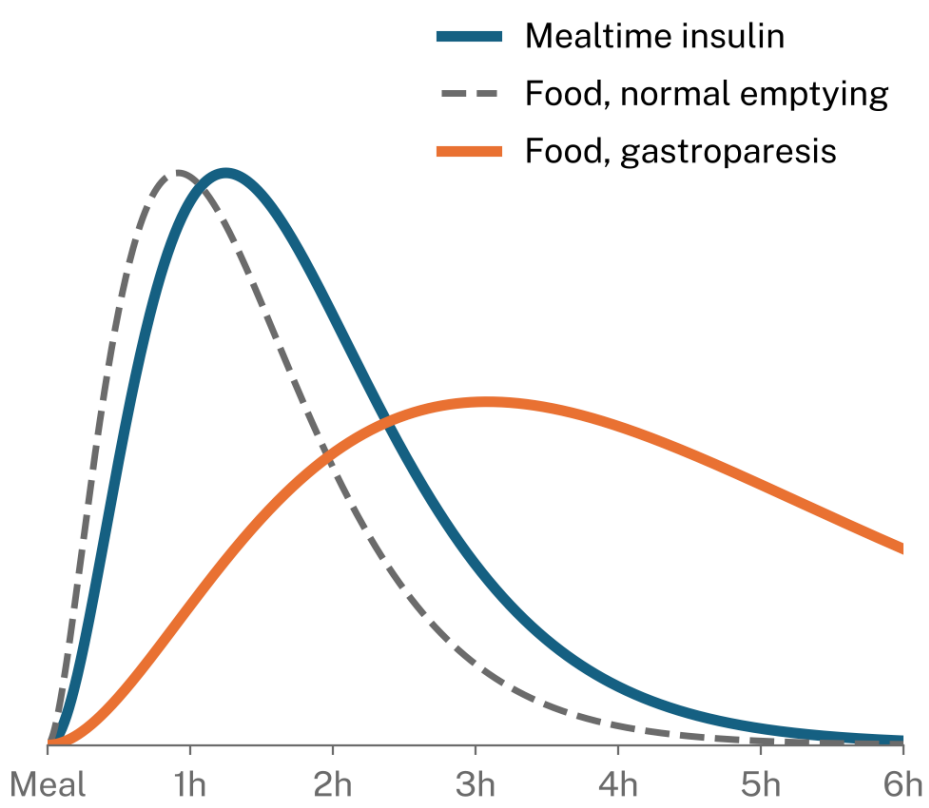
Caution: speeding emptying may not relieve symptoms, and can worsen post-meal glucose

AGA 2025; Rao & Camilleri, Aliment Pharmacol Ther 2010; Camilleri, JAMA 2026; ADA 2026; Goyal, NEJM 2021

Gastroparesis: Implications for Insulin Users

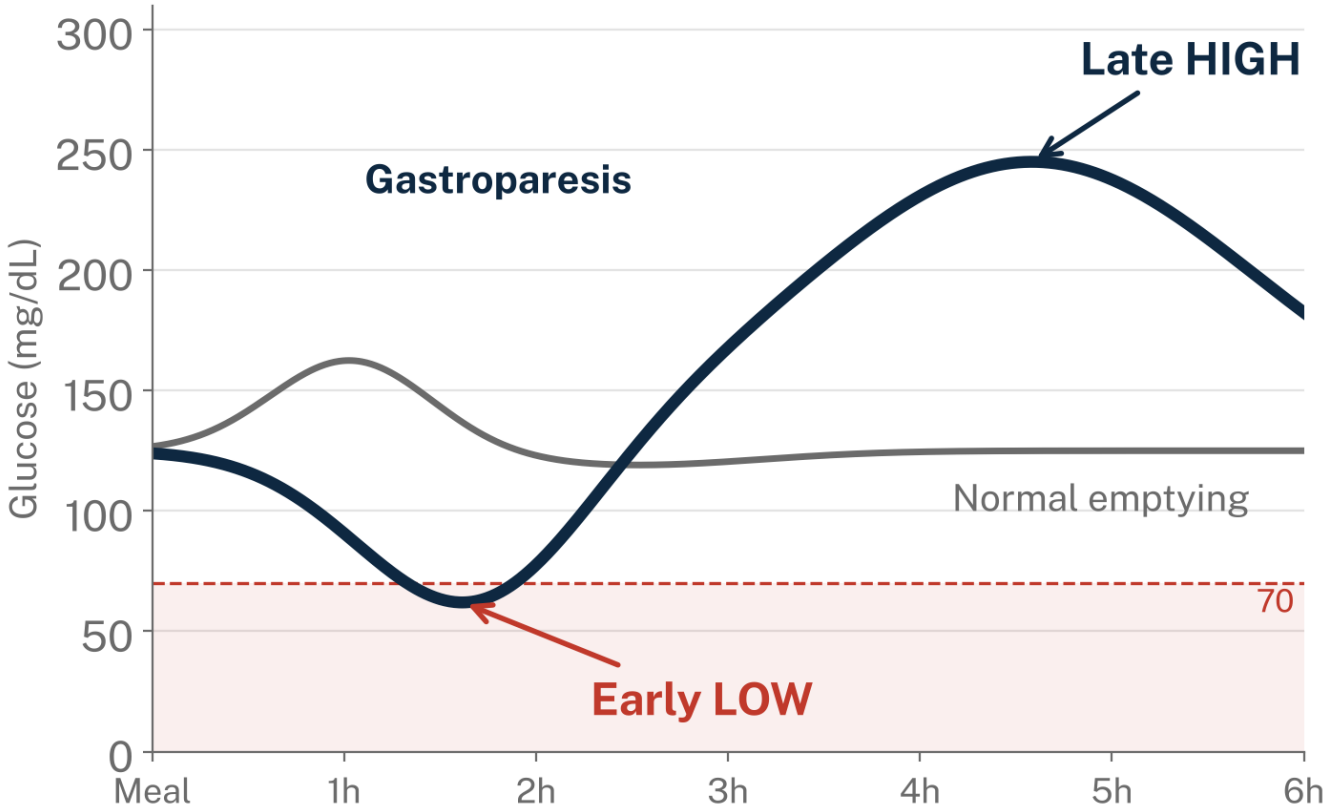
Why

Food arrives after the insulin peaks



The result

An early low, then a late high



Schematic illustration, not patient data. Goyal, N Engl J Med 2021; Jalleh et al., Endocrinology Today 2023

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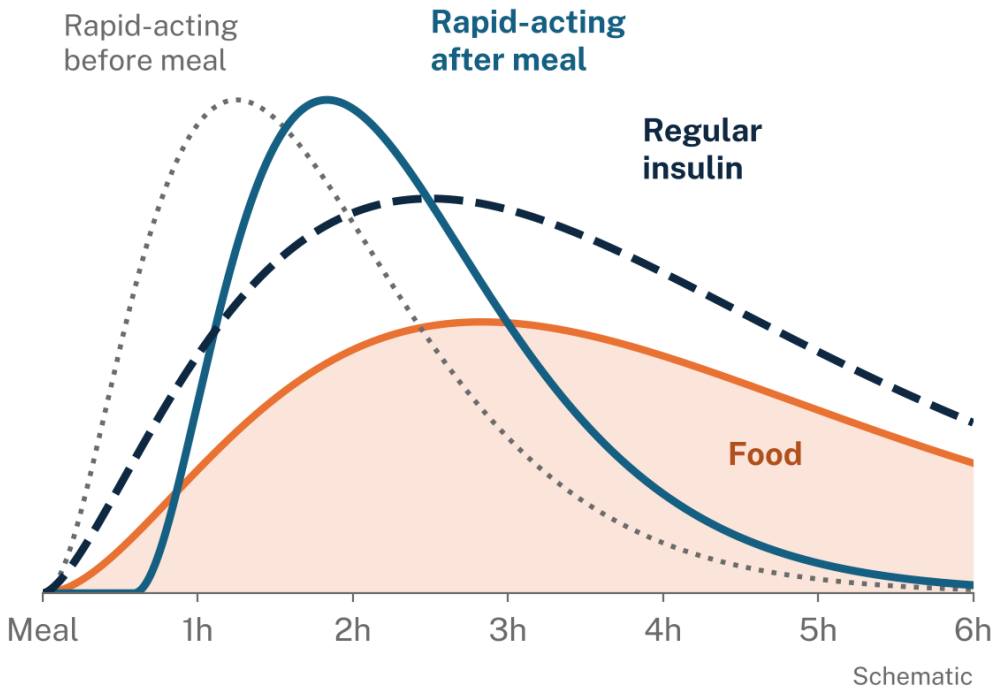
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Simple Insulin Strategies

Largely an evidence-free zone: guidelines are silent, so these reflect pharmacology and small studies

1. **CGM for every insulin user**
   Shows the low-then-high pattern; use low alarms
2. **Keep basal insulin steady**
   Adjust the mealtime dose, not the basal
3. **Dose immediately after eating**
   Based on what was actually eaten and kept down
4. **Or split the mealtime dose**
   Half before the meal, half 30 minutes after finishing
5. **Consider regular insulin for meals**
   Slower onset fits slower absorption
6. **Consider automated insulin delivery (AID)**
   Increased basal rate and/or automated correction doses after eating can help

Shift the insulin toward the food



Calles-Escandón et al., PLoS One 2018; Buse et al., Diabetes Obes Metab 2018 (onset 8); Jalleh et al., Endocrinology Today 2023

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Take Home Points

1. **Gastroparesis is typically chronic:** address reversible factors first
2. **Confirm the diagnosis:** 4-hour emptying study after obstruction is excluded
3. **Address mimics and medications:** always ask about cannabis; reconsider opioids, anticholinergics, GLP-1 RAs
4. **Optimize glucose:** limited evidence, but highs worsen emptying and testing
5. **Focus on nutritional strategies:** small, frequent, small-particle, lower-fat meals; refer to a dietitian early
6. **Medications only if needed:** short courses, reassessed at 4–8 weeks
7. **Consider automated insulin delivery (AID):** for insulin users with erratic glucose

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