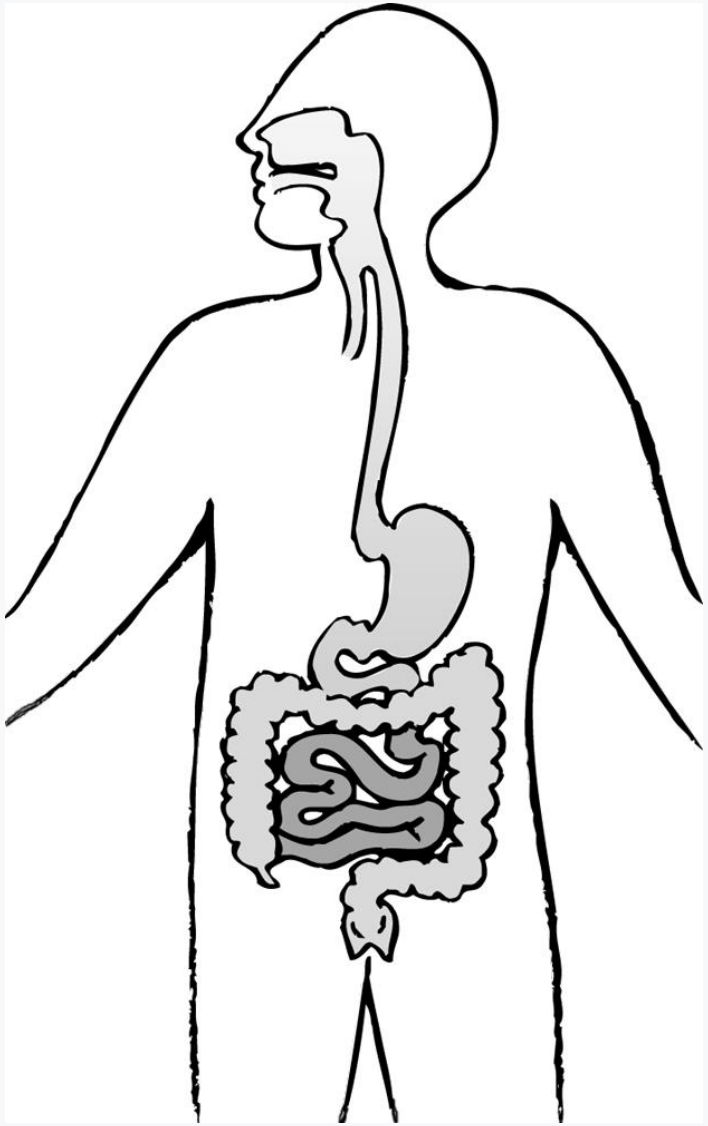
Intestinal Gas

Causes, clinical presentation, and management



Intestinal Gas | Key Concepts

1. Clinical overview

Intestinal gas commonly manifests as belching (eructation), abdominal bloating or discomfort, and flatulence. Passing gas is physiologic (approximately 10–25 times daily); more frequent passage can be perceived as excessive. [1–3]

2. Mechanism and causes

Gas arises mainly from swallowed air and colonic bacterial fermentation of incompletely absorbed carbohydrates, producing carbon dioxide, hydrogen, and sometimes methane. Predisposing factors include diet, aerophagia, lactase deficiency, IBS, other gastrointestinal disorders, and medicines. [1,2]

Intestinal Gas | Key Concepts

3. Dietary triggers

Common dietary triggers include beans; carbonated or fruit drinks; dairy products; certain fruits (e.g., pears, prunes, apples); wheat/bran; cruciferous vegetables and onions; and some fatty or fried foods. Susceptibility varies by patient. [4]

4. Aerophagia and lactose intolerance

Rapid eating or drinking, carbonated beverages, gum chewing, straws, smoking, and anxiety increase air swallowing. With low lactase activity, unabsorbed lactose reaches the colon and is fermented, causing gas, bloating, cramps, nausea, and sometimes diarrhea. [1,3,4]

Intestinal Gas | Key Concepts

5. Associated conditions and medications

IBS and celiac disease may be associated with gas symptoms. Contributing medications include lactulose, antibiotics, acarbose, miglitol, metformin, orlistat, opioids, anticholinergics, calcium-channel blockers, psyllium, cholestyramine, and effervescent preparations. [1,2]

6. Assessment and red flags

Typical symptoms are bloating, belching, flatulence, discomfort/cramps, and sometimes nausea or dyspepsia. Prompt medical assessment is indicated with weight loss, gastrointestinal bleeding, moderate-to-severe abdominal pain, vomiting, or fever/chills. [1,3]

Management: Nonpharmacologic therapy

1-Avoid rush through a meal. Eat and drink slowly in a calm environment (1).
2-Chew food thoroughly (1).
3-Avoid washing down solids with a beverage (1).
4-Avoid gulping and sipping liquids, drinking out of small mouthed bottles or straws, or drinking from water fountains (1).
5-Avoid chewing gum and sucking hard candy, especially those that contain artificial sweeteners (e.g., sorbitol or mannitol) (1).
6-Do not overload the stomach at any one meal (1). Eating smaller more frequent meals throughout the day may help decreasing the symptoms (3).
7-Avoid gas-producing foods, carbonated beverages (e.g., sodas), caffeinated beverages (e.g., coffee, energy drinks) and smoking (1).
8-Avoid or minimize the use of drugs that may cause intestinal gas symptoms (1).
9-Patients with lactose intolerance either should avoid milk and dairy products or should use lactase replacement products (1).

Pharmacologic therapy

1-Simethicone and activated charcoal may relieve symptoms after intestinal gas has formed (1).

2-Alphagalactosidase and lactase enzymes are taken with foods to prevent gas from forming (1).

3-Lactase replacement products may be beneficial for the treatment of intestinal gas and diarrhea associated with lactose intolerance (1).

4-The usual adult and pediatric dosages of these drugs are provided in (Table1-11).

Simethicone

1-Simethicone (a mixture of inert silicon polymers) is used as a defoaming agent to relieve gas (it aids to make gas bubbles eliminated more easily by belching or passing gas through the rectum) (1).

2-Because simethicone is not absorbed from the GI tract, it has no known systemic side effects; its safety has been well documented (1).

3-Simethicone is contraindicated in patients with a known hypersensitivity to simethicone products or suspected intestinal perforation and obstruction (1).

Activated charcoal

1-Activated charcoal also is promoted for relief of intestinal gas; however, it is neither approved nor shown to be effective for this indication (1). (Should not be recommended) (3).

2-Activated charcoal also has poor palatability (1).

3-External devices containing activated charcoal also are available to reduce the odor of flatus in patients with ostomies (1).

Alpha-galactosidase

1-This enzyme hydrolyzes oligosaccharides into their component parts before they can be metabolized by colonic bacteria (1).

2-Because high fiber foods contain large amounts of oligosaccharides, alpha-galactosidase is recommended as a prophylactic treatment of intestinal gas symptoms produced by high fiber diets or foods that contain oligosaccharides (Table1-10) (1).

3-Because the enzyme produces galactose, this product should not be used by patients with galactosemia (an inherited metabolic disorder in which galactose accumulates in the blood because of the deficiency of an enzyme that catalyzes galactose's conversion to glucose) (1).

4-Patients with diabetes should consult an appropriate health care provider before initiation of self-treatment (1).

5-Enzyme products should not be put on hot foods as heat inactivates the enzyme. Patient should place liquid enzyme on the first spoonful of food (3).

Alpha-galactosidase

Table 1-10: Oligosaccharide containing foods that alpha-galactosidase might affect [1].		
Vegetables	**Grains**	**Beans**
Beets, broccoli, cabbage, corn, cucumbers, leeks, lettuce, onions, parsley, peppers.	Barley, oat bran, rice bran, rye, sorghum grain, wheat bran, whole wheat flour, soy products (soy milk, tofu), seed flour (sesame, sunflower).	Black-eyed peas, buckbeans, broad beans, chickpeas, lentils lima beans, mung beans, pinto beans, red kidney beans.

Lactase replacement products

1-Lactase replacement products are used in patients with lactose intolerance. Lactase enzymes break down lactose, a disaccharide, into the monosaccharides (glucose and galactose), which are absorbed (1).

2-Lactase replacement products should be used in patients with lactose intolerance to aid in the digestion of dairy products (1).

3-There are no adverse effects listed for lactase replacement products (1).

Probiotics or prebiotics

No consensus has emerged on whether probiotics or prebiotics are beneficial in patients with lactose intolerance or chronic abdominal bloating.

Increasing evidence, however, suggests that probiotics may be beneficial for treatment of intestinal gas symptoms in patients with IBS because these agents have favorable effects on the bacterial content of the small intestine and colon (1).

Bismuth subsalicylate (adsorbent)

It capable of binding a considerable amount of sulfide gas. Therefore, it may be effective in short-term relief of gases.

However, to avoid salicylate toxicity, do not recommend it for long-term use (> 3-4 weeks) or high doses (>150 mg/kg) (3).

Adult dose: 524 mg QID (maximum 8 doses/day) (3).

Table 1-11: Dosage guideline for intestinal gas products [1].				
Agent	Adults	Children ≥ 12 Years	Children 2 to < 12 Years	**Children < 2 Years**
Simethicone	40–125 mg orally after meals and at bedtime, as needed	40–125 mg orally 4 times daily after meals and at bedtime, as needed	40–50 mg orally 4 times daily after meals and at bedtime, as needed	**20 mg orally 4 times daily, after meals and at bedtime, as needed**
Activated charcoal	500–520 mg orally after meals, as needed; may repeat hourly	Specific guidelines not available	Specific guidelines not available	**Specific guidelines not available**
Alpha-galactosidase	300–450 units orally per serving of food	Specific guidelines not available	Specific guidelines not available	**Specific guidelines not available**
Lactase enzyme	3000–18,000 units orally at first bite of food or drink containing lactose	3000–18,000 units orally at first bite of food or drink containing lactose	Specific guidelines not available	**Specific guidelines not available**
Probiotics	**Specific guidelines not available**	**Specific guidelines not available**	**Specific guidelines not available**	**Specific guidelines not available**

References

1-American pharmacists association. Handbook of Non-prescription drugs: An Interactive Approach to Self-Care. 20th edition. 2020.

2-W. Steven Pray. Strategies for the Relief of Bloating and Gas. US Pharm. 2009; 34(12):16-22.

3-Canadian American pharmacists association (CPhA). CTMA: Compendium of Therapeutics for Minor Ailments. 2019.

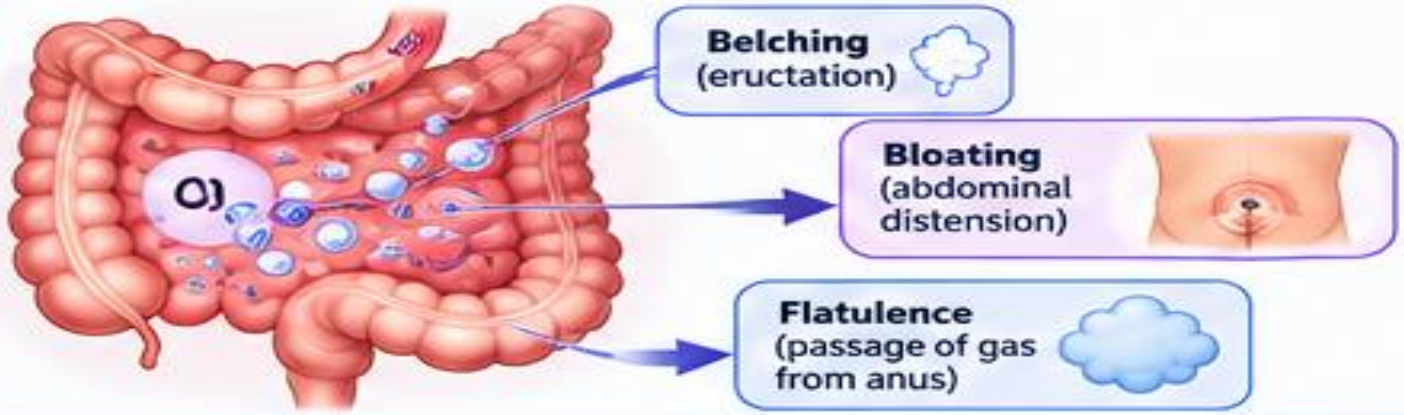
4-Guido R. Zanni. Coping with Intestinal Gas. Pharmacy times. August 18, 2010.

Intestinal Gas

Causes, clinical presentation, and management

1. Overview

- Intestinal gas is common and may cause considerable discomfort and lifestyle impairment.
- Main symptoms: eructation (belching), bloating, and flatulence.
- Passing gas is normal and occurs consciously or unconsciously, even during sleep.
- Average: 10–25 times/day (>25 times/day may be excessive).



2. Pathophysiology

Excess **intestinal gas** results from **multiple sources:**

Air swallowing (aerophagia)



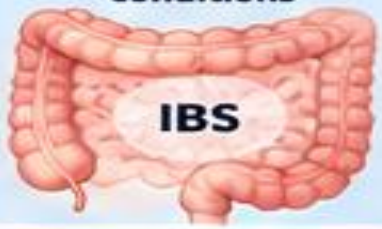
Diet (undigested carbohydrates)



Lactose intolerance



IBS and other conditions



Medications



3. Diet and Gas Production

- Incompletely absorbed carbohydrates reach the colon, where bacteria ferment them, producing CO_2, H_2 and sometimes methane.
- Dietary sugars are main substrates for hydrogen gas production.

4. Gas-Producing Foods



- Beans, eggs, fried and fatty foods
- **Beverages:** Carbonated drinks, fruit drinks
- **Dairy:** Milk, cheese and other

Intestinal Gas | Visual Summary 2/2





Dairy: Milk, cheese and other milk products

Fruits: Apricots, bananas, melons, peaches, pears, prunes, raw apples

Grains: Wheat and wheat bran

Vegetables: Broccoli, cabbage, cauliflower, cucumbers, green peppers, onions, peas, radishes, raw potatoes

5. Aerophagia (Air Swallowing)

- We swallow up to 2 quarts of air daily (mainly while eating and drinking).
- Also increased by gum chewing, drinking with a straw, and smoking.
- More than 1 cup of air is swallowed when drinking a full glass of water.


Eating quickly or large meals


Carbonated drinks


Chewing gum

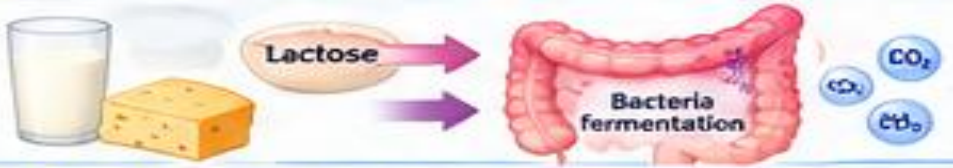

Drinking with straw


Anxiety


Smoking

6. Lactose Intolerance

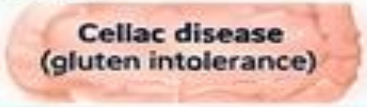
- Up to 30% of adults have difficulty digesting lactose.
- Lactase deficiency (congenital or acquired) leads to undigested lactose reaching the colon.
- Colonic bacteria ferment lactose → gas.
- Symptoms: gas, bloating, nausea, diarrhea.



7. IBS and Other Conditions

- IBS is a common cause of intestinal gas symptoms.
- Other conditions: celiac disease (gluten intolerance) causing inflamnatary response in the GI tract.


IBS


Celiac disease (gluten intolerance)

8. Drugs Causing Intestinal Gas

- Affect intestinal flora: lactulose, antibiotics.
- **Affect metabolism:** α-glucosidase inhibitors (acarbose, miglitol), biguanides (metformin), GI lipase inhibitor (orlistat).
- **Affect GI motility:** narcotics, anticholinergics, calcium channel blockers.
- High fiber or nonabsorbable polymers: psyllium, cholestyramine.
- Contain or release gas: effervescent solutions.



9. Clinical Presentation

- Excessive belching, bloating, abdominal discomfort or cramping, flatulence.
- Other symptoms: nausea, audible bowel sounds, dyspepsia.
- Investigate promptly if alarm symptoms: weight loss, blood in vomit or stool, moderate-severe abdominal pain, vomiting, fever or chills.



10. Management

Nonpharmacologic

- Eat slowly, avoid large meals.
- Avoid carbonated drinks, gum, smoking.
- Identify and avoid gas-producing foods.
- Reduce dairy in lactose intolerance.
- Manage underlying conditions (IBS, celiac).

Pharmacologic

- Antiflatulents (e.g., simethicone)
- Enzymes (e.g., lactase)
- Probiotics
- Treat underlying conditions
- Review and adjust causative drugs

Summary: Intestinal gas results from diet, air swallowing, lactose intolerance, IBS, and certain drugs. Management includes dietary and lifestyle measures, specific treatments, and addressing underlying causes.

Ahmed Ibrahim
B. Pharm. FIBMS Clinical Pharmacy