



Gas and Bloating

Stephen E. Goldfinger, MD; J. Thomas LaMont, MD; Leah K. Moynihan, RNC, MSN; Peter A. L. Bonis, MD.

Gas and Bloating Some people feel that they pass too much gas (flatulence) or burp too frequently, both of which can be a source of embarrassment and discomfort. The average adult produces about one to three pints of gas each day, which is passed through the anus 14 to 23 times per day. Burping occasionally before or after meals is also normal.

The amount of gas produced by the body depends upon a person's diet and individual factors. However, most people who complain of excessive gas do not produce more gas than the average person. Instead, they often have an increased awareness of normal amounts of gas.

On the other hand, several foods and medical conditions can cause excessive gas production. This topic reviews the sources of intestinal gas, conditions that increase sensitivity to gas, and measures to reduce gas production.

Source of Gas

There are two primary sources of intestinal gas: gas that is ingested (mostly swallowed air) and gas that is produced by bacteria in the colon.

Air swallowing

Air swallowing is the major source of gas in the stomach. It is normal to swallow a small amount of air when eating and drinking and when swallowing saliva. Larger amounts of air may be swallowed when eating food rapidly, gulping liquids, chewing gum, or smoking.

Most swallowed air is eliminated by belching (or "eructation"), so that only a relatively small amount passes from the stomach into the small intestine. However, posture may influence how much air passes to the small intestine. In an upright position, most swallowed air passes back up the esophagus and is expelled through the mouth. On the other hand, when lying down, swallowed air tends to pass into the small intestine. Some of the oxygen and nitrogen in swallowed air may be absorbed through the walls of the GI tract into the bloodstream.

Belching may be voluntary or occur unintentionally. Involuntary belching is a normal process that typically occurs after eating to release air that enlarges or stretches the stomach. Belching is more common with certain foods that relax the ring-shaped muscle (sphincter) around the lower end of the esophagus where it joins the stomach. Such foods include peppermint, chocolate, and fats.

Bacterial production

The colon normally provides a home for billions of harmless bacteria, some of which support the health of the bowel. Carbohydrates are normally digested by enzymes in the small

intestine. However, certain carbohydrates are incompletely digested, allowing bacteria in the colon to digest them. The by-products of bacterial digestion include odorless vapors, such as carbon dioxide, hydrogen, and methane. Minor components of flatus (gas expelled through the anus) have an unpleasant odor, including trace amounts of sulfur-containing gases that are released by bacteria in the large intestine.

Some carbohydrates, such as raffinose, are not well digested, and therefore cause increased amounts of gas. A number of vegetables contain raffinose, such as cabbage, Brussels sprouts, asparagus, broccoli, and some whole grains. As a result, these foods tend to cause more gas and flatulence.

Some people are not able to digest certain carbohydrates. A classic example is lactose, the major sugar contained in dairy products. Thus, consuming large amounts of lactose may lead to increased gas production, along with cramping and diarrhea.

Certain diseases can also cause excessive bloating and gas. For example, people with diabetes or scleroderma may, over time, have slowing in the peristaltic (forward propulsion) activity of the small intestine. This can lead to bacterial overgrowth within the bowel, with poor digestion of carbohydrates and other nutrients.

Gas and Bloating Symptoms

Some people feel they pass an excessive amount of gas from below or burp too frequently. Other people notice abdominal distension and crampy abdominal pain. Such pain may be perceived in areas where gas can become

trapped, such as in bends in the colon, which occur naturally in the area under the liver (upper to mid right part of the abdomen), and in the area under the spleen (upper to mid left part of the abdomen).

Sensitivity To Gas

The link between flatulence, belching, and the actual amount of gas in the intestines is not always clear. The vast majority of people who complain about gas-related symptoms do not have an excessive amount of gas in the intestine, but rather they have an increased sensitivity to normal amounts of gas in the intestine. This can happen in a variety of circumstances.

Irritable bowel syndrome

Many people with irritable bowel syndrome (IBS) are sensitive to normal amounts of gas. Nerves that carry sensory messages from the bowel may be overactive in people with IBS, so that normal amounts of gas or movement in the gastrointestinal tract are perceived as excessive and painful. The primary symptoms of IBS are abdominal pain and altered bowel habits. Many people also complain of abdominal distension.

Some people with severe IBS feel better when treated with medications that decrease the perception of painful sensations coming from the intestine (such as low doses of imipramine or nortriptyline).

Causes of Increased Gas

The vast majority of people with gas-related complaints do not produce excessive amounts of gas. However, there are several conditions that may lead to increased gas formation.

Aerophagia — Chronic, repeated belching usually occurs when a person frequently swallows large amounts of air (i.e., aerophagia). Aerophagia is typically an unconscious process. Treatment focuses on decreasing air swallowing by eating slowly without gulping and avoiding carbonated beverages, chewing gum, and smoking.

Foods that cause gas — Several foods contain the carbohydrate raffinose, which is poorly digested and increases gas production. Foods that contain raffinose include beans, cabbage, cauliflower, Brussels sprouts, broccoli, and asparagus. Avoiding these foods or eating them infrequently may reduce gas production.

Starch and soluble fiber can also contribute to gas formation. Potatoes, corn, noodles, and wheat produce gas while rice does not. Soluble fiber (found in oat bran, peas and other legumes, beans, and most fruit) also causes gas. Some laxatives contain soluble fiber and may cause gas, particularly during the first few weeks of use.

Lactose intolerance — Intolerance to lactose-containing foods (primarily dairy products) is a common problem. In Europe and

the United States, lactose intolerance affects 7 to 20 percent of people who are white, 80 to 95 percent of Native Americans, 65 to 75 percent of Africans and African Americans, and 50 percent of Hispanics. More than 90 percent of people in some regions of eastern Asia have lactose intolerance.

Lactose intolerance is caused by an impaired ability to digest lactose, the principle sugar in dairy products. Symptoms of lactose intolerance include diarrhea, abdominal pain, and flatulence after consuming milk or milk-containing products.

People who avoid dairy products should take a supplement that contains 1000 mg of calcium and 400 IU vitamin D since dairy products are a primary source of these important substances. This is especially true for children and women.

Intolerance to other sugars — In addition to lactose and raffinose, some people are intolerant of other sugars contained in foods. Two common examples are fructose (contained in dried fruit, honey, sucrose, onions, artichokes, and many foods and drinks that contain “high fructose corn syrup”) and sorbitol (a sugar substitute contained in some sugar free candies and chewing gum).

Diseases associated with increased gas

- Bacterial overgrowth
- Celiac disease (a disease caused by intolerance to a protein contained in wheat), short bowel syndrome

Gas and Bloating Diagnosis

The need for diagnostic tests depends upon the individual's situation.

Specific tests may include:

- Examination of stool to detect the presence of blood, abnormally increased levels of fat (steatorrhea), or the presence of a parasite (Giardia).
- A lactose tolerance test.
- X-ray examination of the small intestine.
- A procedure to examine the inside of the stomach and/or colon (upper endoscopy, sigmoidoscopy, or colonoscopy) may be recommended.
- Antibody tests for celiac disease.

Gas and Bloating Treatment

Diet recommendations

Avoid foods that appear to aggravate symptoms. These may include milk and dairy products, certain fruits or vegetables, whole grains, artificial sweeteners, and/or carbonated beverages. A record of foods and beverages consumed over time may help to pinpoint which foods are bothersome.

If you are lactose intolerant, do not consume products that contain lactose and use a lactose-digestive aid, such as lactose-reduced milk or over-the-counter lactase supplements (e.g., LactAid® tablets or liquid). People who avoid dairy products should take a calcium supplement.

Over-the-counter medications

Try an over-the-counter product that contains simethicone, such as certain antacids (eg, Maalox® Anti-Gas, Mylanta® Gas, Gas-X®, Phazyme®). Simethicone causes gas bubbles to break up and is widely used to relieve gas, although its benefit is questionable.

Try an over-the-counter product that contains activated charcoal (eg, CharcoCaps®, CharcoAid®). Evidence concerning the benefit of activated charcoal is contradictory: its benefit has been supported by some studies and refuted by others. It is reasonable to try.

Try Beano™, an over-the-counter preparation that contains an enzyme (alpha-galactosidase), which helps to breakdown certain complex carbohydrates. This agent may be effective in reducing gas production and frequency in people who have increased gas after eating beans or other vegetables that contain raffinose.

Try bismuth subsalicylate (eg, Pepto-Bismol®) to reduce the odor of unpleasant smelling gas due to hydrogen sulfide, a sulfur-containing compound.