

Digestive Health Associates Newsletter

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Undernourished, intelligence becomes like the bloated belly of a starving child: swollen, filled with nothing the body can use.”

- Andrea Dworkin

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Dr. Rajiv Sharma attended medical school at Dayanand Medical College, Punjab, India. He received his Internal Medicine training from Loma Linda University, Loma Linda, California and received his Gastroenterology Fellowship training from University of Rochester, Rochester, New York. Dr. Sharma trained under the mentorship of Dr. Richard G. Farmer, who is world renowned for his work on Inflammatory Bowel Disease.

Dr. Sharma's special interests include GERD, NERD, Inflammatory Bowel Disease (Crohn's & Ulcerative Colitis), IBS, Acute and Chronic Pancreatitis, Gastrointestinal Malignancies and Familial Cancer Syndromes.

In an effort to share his extensive knowledge with the public, Dr. Sharma released his first book, Pursuit of Gut Happiness: A Guide for Using Probiotics to Achieve Optimal Health, in 2014.

In Dr. Sharma's free time, he enjoys medical writing, watching movies, exercising and spending time with his family. He believes in "whole person care" and the effect of mind, body and spirit on "wellness". He has a special interest in nutrition, exercise and healthy eating. He prides himself on being a "fact doctor" as he backs his opinions and works with solid scientific research while aiming to deliver a simple and clear message.

Today's Topic: Bloating

Bloating may seem an odd topic to choose for our first newsletter. It's a common condition, often overlooked by physicians and patients alike, but it can also be an extremely useful diagnostic clue. Many serious conditions may present with bloating as an initial symptom. The treatment of bloating can also be very complicated; the underlying causes of bloating are varied and the treatment is often a change in diet or lifestyle rather than a drug.

Bloating is defined as an uncomfortable sensation of tightness or fullness in the abdomen. It may or may not be accompanied by distension (an increase in abdominal diameter), flatus, belching, or abdominal pain.

Because everyone has experienced bloating at some time in their lives it can be tempting to dismiss it as a simple, straightforward symptom, the etiology is actually quite complex however. While the sensation of bloat-

Differential Diagnosis

The following conditions may present with bloating:

- Acute infectious enteritis
- Acute or subacute bowel ischemia (eg, left sided heart failure)
- Aerophagia
- Ascites
- Celiac disease
- Chronic constipation
- Diet
 - ◆ Lactose intolerance
 - ◆ Fructose intolerance
 - ◆ Gluten sensitivity
 - ◆ High intake of nonabsorbable sugars (eg, sorbitol)
 - ◆ High intake of FODMAPs
- Disturbances in colonic microflora
- Eating disorders (anorexia, bulimia)
- Evacuation disorders of the pelvic floor
- Functional diseases (IBS, functional bloating, functional dyspepsia, etc.)
- Gastroparesis
- Irritable bowel disease (crohn's or ulcerative colitis)
- Medication side effect
- Parasitic disease (eg, giardia)
- Small bowel diverticulosis
- Small intestinal bacterial overgrowth
- Abnormal small intestinal motility (eg, blockage, scleroderma, diabetic neuropathy)

ing is often blamed on excess air in the intestinal tract, this is actually a false assumption in many cases (1). Excess intestinal air is only one cause of feeling bloated; it can also be caused by

excess solids/liquids or increased sensitivity of the bowels. Location also matters: air in the small intestines is much more likely to be experienced as bloating than air in the colon.

beverages, drinking through straws, smoking, chewing gum, sucking on candy, and eating too fast. Patients with ill-fitting dentures are also more likely to swallow excess air.

Signs of a More Serious Problem

A patient that presents with the following alarm signs, in addition to bloating, should be given a further workup to rule out serious conditions:

- ◆ Diarrhea
- ◆ Weight loss
- ◆ Abdominal pain
- ◆ Anemia
- ◆ Blood in the stool
- ◆ Lack of appetite
- ◆ Fever
- ◆ Vomiting
- ◆ Bloating that has a sudden onset
- ◆ Unilateral bloating

This issue of the Digestive Health Newsletter will explore bloating as a complex and informative symptom that can enrich your knowledge of topics ranging from colic to irritable bowel disease (IBS).

The Causes of Excess Intestinal Gas

While bloating is not always caused by excess intestinal gas, it is often at least a contributing factor. There are only two sources of intestinal gas: ingested air and gas produced by gut microbiota.

Ingested air rarely leads to bloating because it is quickly expelled either by belching or absorption. However, patients with functional abdominal symptoms such as IBS are much more likely to have an impaired ability to expel or absorb excess swallowed air (1). If your patient is experiencing excess belching in addition to bloating it may be beneficial to recommend that they avoid the following: carbonated

Unlike ingested air, gas produced by gut bacteria is much more likely to produce bloating.

Lab Workup

- ◆ Suspected food intolerance
 - Breath test (for lactose or fructose intolerance)
 - Food diary
 - Elimination diet
 - ◆ Suspected small intestinal bacterial overgrowth (SIBO)
 - Breath test
 - Small bowel culture
 - Imaging to look for predisposing factors such as diverticula
 - Empiric antibiotics
- There are many ways to go about testing for SIBO. The gold standard, a culture of the small bowel, is also costly and invasive so many practitioners choose to use a breath test instead.
- ◆ Signs of malabsorption (eg, weight loss, anemia, steatorrhea)
 - CBC

- Celiac blood test
- Upper endoscopy with duodenal biopsies
- ◆ Coexisting nausea and vomiting
 - Small bowel imaging
 - Gastric-emptying scan
- ◆ Coexisting diarrhea
 - Stool studies
 - Colonoscopy

Imaging studies may be used to rule out obstruction or conditions that may predispose to SIBO.

Non-pathological bloating

Occasionally, a patient may present with complaints of minor bloating episodes that are primarily due to large meals and high FODMAP foods rather than pathology.

“Foods high in FODMAPs tend to produce gas and bloating because they feed the colonic microbiome.”

These patients may be counseled to eat smaller meals and chew well in order to reduce the amount of undigested carbohydrate that reaches the colon. Foods high in FODMAPs, starches, and insoluble fiber are more likely to aggravate symptoms. You may counsel your patients to replace their starchy food of choice with white rice which does not produce gas.

Additional lifestyle modifications such as weight loss, probiotic foods (eg. Yogurt 2-3 times per day), and exercise may also be beneficial. Excess

abdominal adipose tissue can aggravate the sensation of bloating via mechanical pressure on the gut as well as increasing gut inflammation which may increase bowel sensitivity to pressure.

In addition to lifestyle modifications there are also OTC products that may be helpful:

- ◆ Beano breaks down the complex carbs found in beans and other raffinose-containing vegetables.
- ◆ Activated charcoal taken with meals may help to absorb excess gas.
- ◆ Pepto-Bismol may not reduce the volume of gas, but it can reduce the odor.

What are FODMAPs?

Beans are famous for their tendency to induce gas and bloating. This characteristic is due to their high concentration of galacto-oligosaccharides and fructans. These carbohydrates are examples of FODMAPs (an acronym referring to “fermentable oligosaccharides, disaccharides, monosaccharides and polyols”). Foods high in FODMAPs tend to produce gas and bloating because they feed the colonic microbiome.

ile, the colon is populated by a large and diverse population of microbes. Undigested carbohydrates that make it to the colon are metabolized by some bacteria into gas.

In addition to beans, other high FODMAP foods include:

- ◆ Onions and garlic
- ◆ Asparagus, cabbage, and Brussel sprouts
- ◆ Apples, pears, plums, and peaches
- ◆ Wheat and rye
- ◆ Cashews and pistachios



While the small bowel is usually ster-

Examples of low and high FODMAP foods. Table supplied by the Monash University website. <http://www.med.monash.edu/cecs/gastro/fodmap/low-high.html>

Food Category	High FODMAP foods	Low FODMAP food alternatives
Vegetables	Asparagus, artichokes, onions(all), leek bulb, garlic, legumes/pulses, sugar snap peas, onion and garlic salts, beetroot, Savoy cabbage, celery, sweet corn	Alfalfa, bean sprouts, green beans, bok choy, capsicum (bell pepper), carrot, chives, fresh herbs, choy sum, cucumber, lettuce, tomato, zucchini.
Fruits	Apples, pears, mango, nashi pears, watermelon, nectarines, peaches, plums	Banana, orange, mandarin, grapes, melon
Milk and dairy	Cow's milk, yoghurt, soft cheese, cream, custard, ice cream	Lactose-free milk, lactose-free yoghurts, hard cheese
Protein sources	Legumes/pulses	Meats, fish, chicken, Tofu, tempeh
Breads and cereal	Rye, wheat-containing breads, wheat-based cereals with dried fruit, wheat pasta	Gluten-free bread and sourdough spelt bread, rice bubbles, oats, gluten-free pasta, rice, quinoa
Biscuits (cookies) and snacks	Rye crackers, wheat-based biscuits	Gluten-free biscuits, rice cakes, corn thins
Nuts and seeds	Cashews, pistachios	Almonds (<10 nuts), pumpkin seeds

The Low FODMAP Diet

The low FODMAP diet can be a useful tool for the management of symptoms in IBS, IBD, small intestinal bacterial overgrowth, and even fibromyalgia. The presence of either unbalanced gut flora or increased gut sensitivity means that the patient will likely see an improvement in their symptoms when they limit or eliminate their intake of FODMAPs.

Rather than being a long-term solution, the low FODMAP diet is meant

to be used as a short-term elimination diet to help the patient identify which foods exacerbate their symptoms. It can also be helpful as a way to control symptoms while testing for bacterial overgrowth which should ultimately be treated with antibiotics or antibacterial supplements. The long term effects of a strict low FODMAP diet have not been tested and it is best to address the underlying problem when possible.

Patients interested in trying a low FODMAP diet to control their symptoms should be referred to a dietician familiar with the diet. Alternatively, the book *IBS: Free at Last* by Patsy Catsos M.S. R.D. L.D. is an inexpensive resource that patients may find useful if seeing a dietician is too difficult

Infantile Colic

When an infant of less than three months cries incessantly it is said to have colic. While the exact causes of colic are unknown and are probably varied, digestive issues such as bloating may be a significant contributing factor in many cases. In addition to crying episodes that begin and end abruptly, a colicky infant may also present with abdominal distension, lack of appetite, and constipation (2).

Bloating in a young infant may be caused by excessive air swallowing, altered gut flora, or the ingestion of



There are several types of anti-colic bottles on the market. All are designed to limit the amount of air ingested by the infant. The most effective anti-colic bottles are those that vent the air either through a straw (pictured above) or through a valve on the bottom of the bottle.

proteins through the breast milk that the infant is intolerant to.

To reduce air swallowing, an infant may be breast fed on one side rather than equal time at both breasts. If fed from a bottle, it may be helpful to feed the infant from an upright position via a vented bottle such as the one pictured above (2).

Probiotics may be another useful tool for treating colic. A 2007 study in *Pediatrics* found that infants given *Lactobacillus reuteri* cried significantly less after one month than infants given simethicone (51 minutes/day vs. 145 minutes/day, respectively) (3).

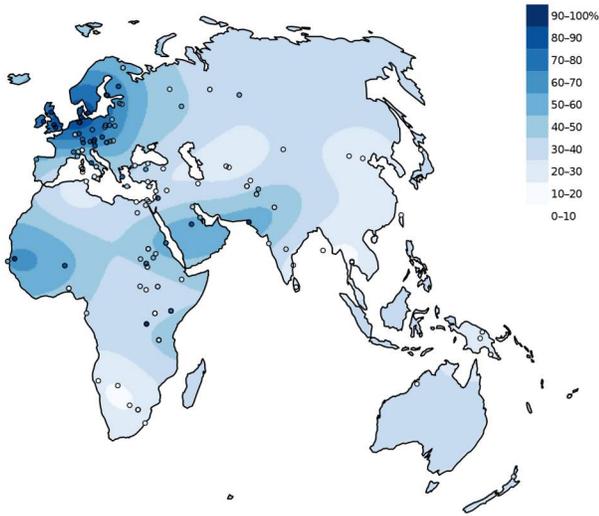
There are three major categories of food in the maternal diet that can increase the symptoms of colic in infants.

1) Cow's milk (4) (5)

2) Allergenic foods (milk, eggs, peanuts, tree nuts, wheat, soy, and fish) (6)

“Bloating in a young infant may be caused by excessive air swallowing, altered gut flora, or the ingestion of proteins through the breast milk that the infant is intolerant to.”

3) High FODMAP foods (broccoli, cabbage, cauliflower, onions, and chocolate) (7)



Lactose intolerance is a common cause of bloating. This map illustrates prevalence of lactose intolerance in the Eastern Hemisphere. In some areas, a significant majority of the population is lactose intolerant.

An elimination diet or the use of a hypoallergenic formula may be a good start to reduce the symptoms of colic in infants.

Food Intolerances

In addition to FODMAPs in healthy individuals, the carbohydrates lactose and fructose can be a major source of bloating in intolerant individuals. A food intolerance refers to an inability to properly digest and absorb a food. For example, lactose intolerant individuals are deficient in the enzyme lactase resulting in the inability to fully breakdown and absorb lactose.

Lactose intolerance is an extremely common condition that is more prevalent in African American, Puerto Rican, and Asian populations. The major symptoms are bloating and diarrhea after consuming dairy products. Patients with this issue can be advised to limit their dairy consumption and/or supplement their diet with the lactase enzyme (eg. Lactaid).

Irritable Bowel Syndrome

10-20% of the world population is estimated to have irritable bowel syndrome, a functional disorder characterized by bloating, diffuse abdominal pain, and altered bowel habits that often present as alternating diarrhea and constipation (8).

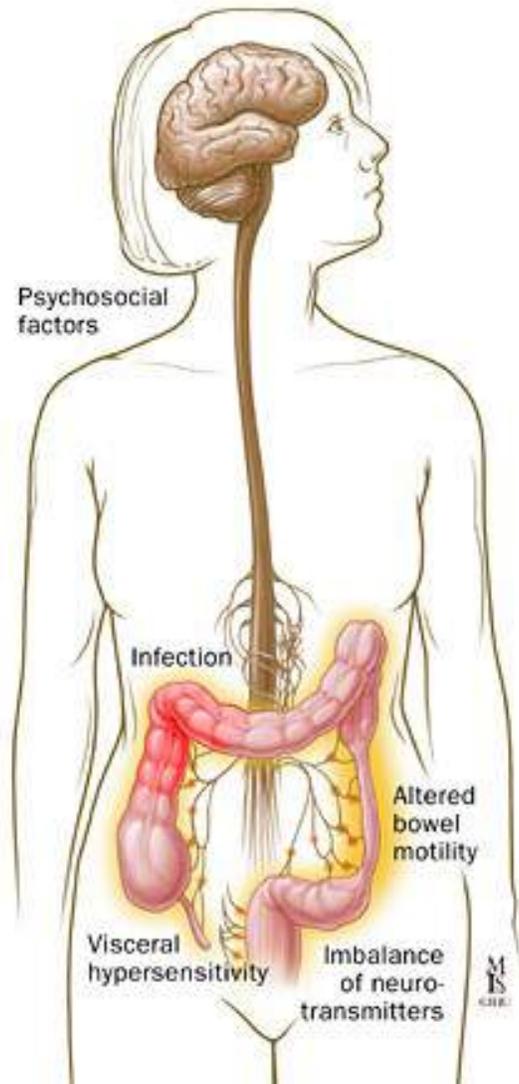
A functional disorder refers to a disease in which the function of an organ is faulty but no specific organic pathology can be found.

Because there is no test for IBS, it should be considered a diagnosis of exclusion with celiac disease and irritable bowel disease (IBD) being high on the differential list. These are both serious disorders that can mimic IBS symptoms. The National Foundation for Celiac Awareness estimates that 83% of celiac cases are either undiagnosed or misdiagnosed. Despite the prevalence and serious dangers of celiac disease, it is still very common for it to be misdiagnosed as IBS. Other diseases to consider include parasitic infections, bacterial overgrowth, food intolerances, and colon cancer.

The American College of Gastroenterologists recommends further testing in patients under 50 with typical IBS symptoms if they are also experiencing weight loss, iron deficiency anemia, or if they have a concerning family history (eg, IBD, celiac, colorectal cancer).

The possible causes of IBS.

Diagram supplied by the Johns Hopkins University website.



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