



## Barrett's Esophagus

The Journey from Acid Reflux to Barrett's Esophagus

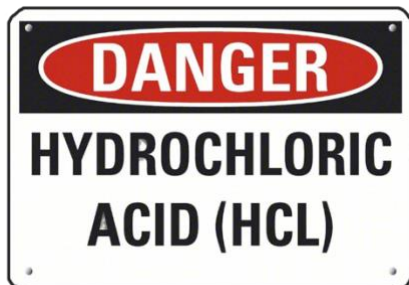
### Historical background and its significance

Barrett's Esophagus, named after the pioneering Australian-born British surgeon **Dr. Norman Barrett**, has profound historical significance. In 1957, Barrett was the first to describe this condition, fundamentally changing how the medical community perceived gastroesophageal reflux disease (GERD) or simply acid reflux. Before his groundbreaking discovery, GERD was largely dismissed as a benign ailment. However, Barrett's research highlighted the severe implications of persistent acid reflux, emphasizing its potential to evolve into a premalignant condition. Today, thanks to Barrett's pioneering work, the medical world recognizes the gravity of this condition and its potential to lead to esophageal cancer (adenocarcinoma), a particularly deadly form of cancer.



### What is acid reflux? GERD?

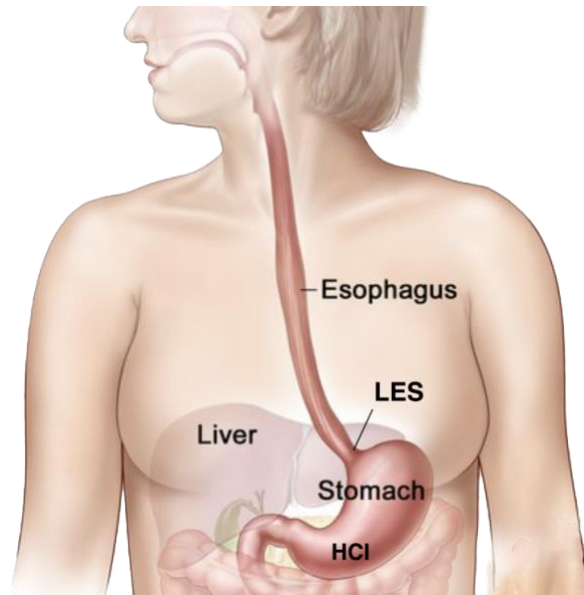
You may remember from high school chemistry class that hydrochloric acid (HCl) is very corrosive. It had to be handled very carefully, wearing special protective gear. It may be hard to believe, but every meal produces that same powerful acid inside your stomach. HCl is so powerful that it can liquify meat, turning that tough porkchop into mush in a very short time. That is how you digest your food.



### Why don't you digest your stomach?

But your stomach is made of "meat," Why don't you digest your own stomach? Well, nature is very smart. Your stomach has an acid-resistant lining that prevents stomach acid from digesting itself. Unfortunately, the esophagus does not have a protective lining.

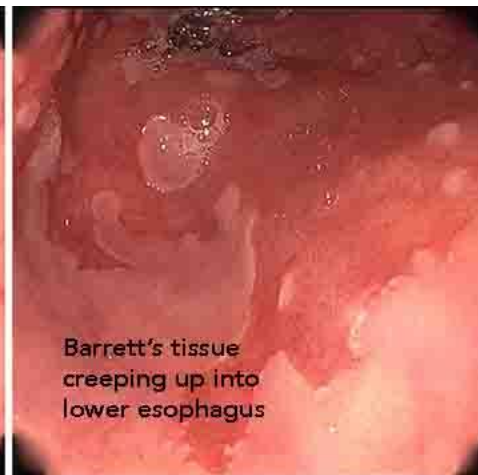
Instead, to protect your esophagus from powerful stomach HCl, you have a one-way valve called the Lower Esophageal Sphincter (LES) at the bottom of your esophagus. *The malfunction of this important valve allows the backslash, or reflux of powerful HCl, into the unprotected esophagus, causing damage. This is called acid reflux or GERD (gastroesophageal reflux disease)*



### **A Strange Esophageal Transformation**

Every organ in the body has its own cell type. The kidney has kidney cells. The liver has liver cells. The bones have bone cells. The esophagus has esophagus cells. The intestines have intestinal cells, and so on. They are all different.

In the setting of longstanding acid reflux, the inner lining of the lower esophagus (called the mucosal layer) becomes damaged and ulcerated. This is due to repeated exposure to powerful stomach acid. When the body tries to heal the damaged esophagus, the normal repair process would be to deposit new healthy esophagus cells over the affected area. But sometimes, for reasons that are not currently clear, the repair process becomes confused. Instead of adding new esophageal cells, *intestinal* cells are deposited in the lower esophagus. It's like fixing a pothole on the street with the wrong color black top. *Little by little, the inner surface of the esophagus is transformed into an intestinal lining. This process is called **Intestinal metaplasia**, the hallmark of Barrett's esophagus.* This change is most prominent at the bottom of the esophagus, where it is connected to the stomach, the gastroesophageal—or GE junction



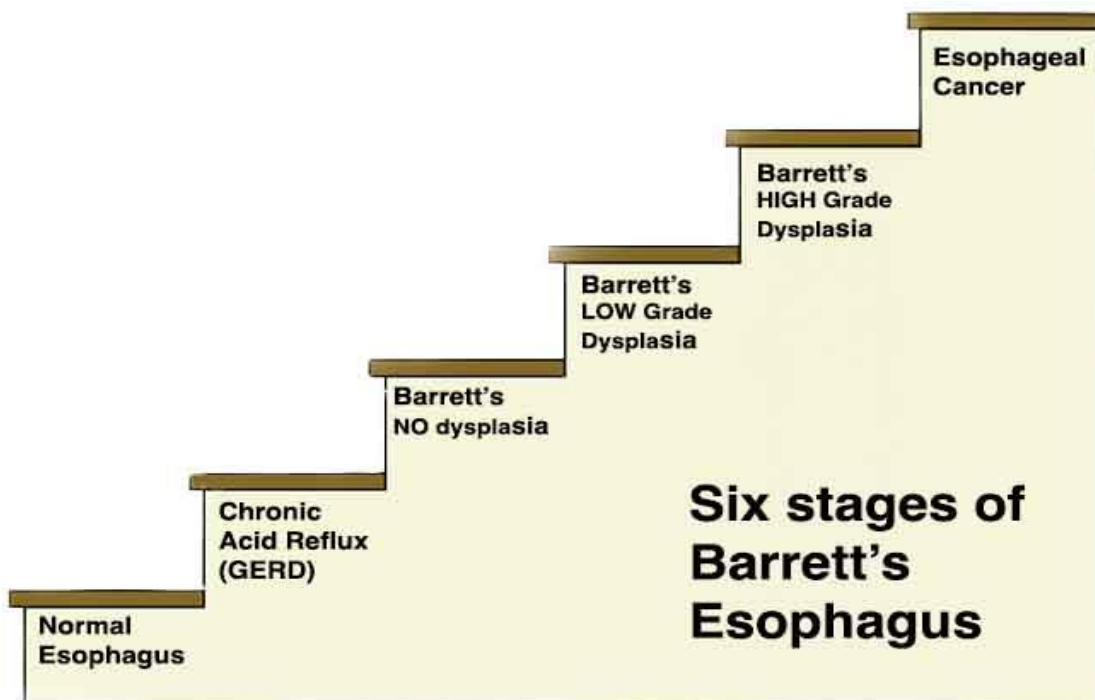
### So, how is Barrett's esophagus diagnosed?

The only way to diagnose Barrett's esophagus is with a test called an upper endoscopy. This involves inserting a thin, lighted, flexible scope (endoscope) through the mouth and down into the esophagus. The procedure is painlessly performed under MAC anesthesia. This allows the doctor to view the inner lining of the esophagus directly. If the appearance suggests Barrett's esophagus, small samples of tissue (biopsies) can be obtained through the endoscope.

A pathologist will examine the tissue to make the diagnosis. The diagnosis of Barrett's Esophagus can only be confirmed with tissue biopsy... not by blood tests or imaging studies.

### The implications of Barrett's esophagus

While Barrett's esophagus isn't cancerous, its presence signifies an increased risk for esophageal cancer. This risk rises when the transformed esophageal cells become *dysplastic* or show abnormal growth patterns. Dysplasia refers to the presence of cells that are growing in an abnormal or disordered manner. There are two stages of dysplasia – *low grade* and *high grade*. To help my patients understand the progression and risk, I often use the analogy of a stairwell with six steps. Each step represents a stage or level of severity, with the topmost step being the most severe or indicative of cancer. As one moves up the steps, the risk and severity increase. Our goal is to prevent our patients from getting to the top rung.



## What are the symptoms of Barrett's?

Barrett's esophagus causes no symptoms. However, the condition is usually associated with chronic heartburn and acid regurgitation. Heartburn symptoms include a burning sensation in the chest and vomit in the back of the throat (acid regurgitation).

Occasional heartburn is very common. Over 60 million Americans experience heartburn at least once a month. Heartburn that occurs at least twice a week is the biggest red flag.

Other symptoms to watch for include:

- Heartburn that worsens or wakes you from sleep.
- Painful or difficult swallowing.
- The sensation of food stuck in your esophagus.
- Constant sore throat, sour taste in your mouth, or bad breath.
- Unintentional weight loss.

## Risk Factors for Barrett's

Factors that increase your risk of Barrett's esophagus include:

Chronic heartburn and acid reflux. Having significant heartburn more than twice a week for more than 5 years. Having heartburn that doesn't get better when taking medications known as proton pump inhibitors or return when medication is discontinued.

Family history. Your odds of having Barrett's esophagus increase if you have a family history of Barrett's esophagus or esophageal cancer.

Being male. Men are far more likely to develop Barrett's esophagus.

Being white. White people have a greater risk of the disease than people of other races.

Age. Barrett's esophagus can occur at any age but is more common in adults over 50.

Current or past smoking.

Being overweight. Body fat around your abdomen further increases your risk.

## How is Barrett's esophagus treated?

The treatment approach is determined by the stage of cell abnormality and the presence or absence of dysplasia.

### **Barrett's Esophagus Without Dysplasia:**

When diagnosed as Barrett's without dysplasia, it means there are no cells that might transform into cancer. Although immediate treatment might not be necessary, regular



monitoring is crucial. An upper endoscopy with surveillance biopsies is recommended every two to three years. It is essential to control acid reflux to help prevent disease progression. Untreated heartburn raises the risk of esophageal cancer by 64 times. Lifestyle modification can also be beneficial for individuals with GERD (Gastroesophageal Reflux Disease). This encompasses sleeping with the head elevated, avoiding late meals, managing weight, and avoiding foods that exacerbate acid reflux. Sleeping on your side - left side down – also reduces nighttime acid reflux.

In addition to lifestyle modifications, patients with Barrett's esophagus need lifelong effective acid suppression to prevent disease progression. There are medications that can be prescribed to reduce stomach acid, thus preventing further esophageal damage. *There are three classes of drugs to treat acid reflux, each more powerful and effective than the one before. I tell patients it's like "Baby Bear, Momma Bear, and Papa Bear."*



**Antacids:** These are often the first line of defense against heartburn. They work by neutralizing stomach acid that is already present. They work quickly and are great for those with minor and infrequent symptoms but have a short beneficial effect. *While antacids can treat symptoms, they don't prevent GERD and do NOT prevent the progression of Barrett's into esophageal cancer.*

(Sadly, I have diagnosed many esophageal cancers in my 46-year career as a gastroenterologist. Most of these cases were men who have taken TUMS many times throughout the day, every day, for many years to control heartburn. They usually purchase TUMS in large quantities and have them stored in their briefcase, truck, office, and home. Their symptoms are under control, but the disease progresses. Antacids can mask the symptoms but do NOT prevent cancer.



**H2 Blockers:** These medications were miraculous in the 1970's. The first was Tagamet. They don't neutralize acid. They *prevent* acid production by blocking histamine-2 receptors in the stomach. Hence, the name... They are much more effective than antacids but still have a relatively short beneficial effect. Famotidine (Pepcid AC) and cimetidine are available OTC, while nizatidine (Axid) is prescription-based. All of these are also available in higher-dose prescription strength. Ranitidine (Zantac) was discontinued due to concerns about harmful chemical levels. (Confusingly, the name Zantac came back on the market as another name for famotidine.) These blockers can be taken before consuming foods or drinks that trigger heartburn. They are better than antacids. Still, these drugs are not the most

powerful to control acid reflux and control Barrett's. They are often used in conjunction with proton pump inhibitors (see below) to boost their effectiveness.



### **Proton Pump Inhibitors (PPIs)**

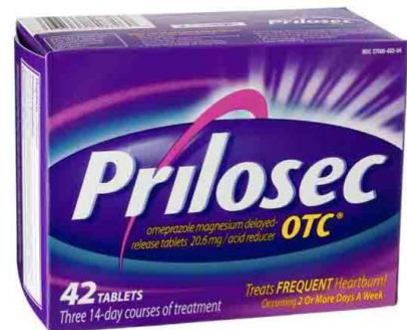
If antacids and H2 blockers don't alleviate your acid reflux symptoms, your healthcare provider might suggest a Proton Pump Inhibitor (PPI). PPIs operate at the cellular level within the stomach lining. They inhibit an enzyme responsible for producing stomach acid. By doing so, they dramatically reduce the amount of acid the stomach produces, alleviating heartburn and GERD symptoms. *Their beneficial effect is long-lasting, making this class of drugs ideally suited to treat acid reflux and Barrett's esophagus.*

Common PPIs include:

- Omeprazole (Prilosec)
- Pantoprazole (Protonix)
- Lansoprazole (Prevacid)
- Esomeprazole (Nexium)

All these PPIs are available over-the-counter (OTC) and by prescription, except for Pantoprazole. Unlike antacids and H2 blockers, timing is important when taking PPIs. For maximum benefit, they are best taken about 30 minutes before the day's first meal. i.e., you must eat within two hours of taking the medication, but not the first 30 minutes.)

Side Effects of PPIs: While generally mild, PPI side effects can include headaches and diarrhea in some patients. There is no increased risk of stomach cancer, a fear that some patients have expressed. Reducing stomach acid may decrease vitamin B12 absorption, and I advise my patients to take a daily dose of 1000 mcg of vitamin B12 daily. There are also some unfounded concerns about long-term PPI use and dementia, but recent large clinical studies have not shown any major signals. For example, a recent large [study](#) published in June 2023 of 19,000 adults over age 65 showed NO association between long-term PPI use and dementia. Similar findings were noted in the large National Nurses Study. Working with your healthcare provider to determine the PPI dose and weigh the potential risks against the benefits is essential. In patients with biopsy-confirmed Barrett's, there is no question about the risk-benefit ratio.



### **Barrett's Esophagus with Dysplasia:**

Dysplasia indicates the presence of precancerous cells. The treatment and monitoring frequency depend on the grade of the dysplasia.

Low-grade Dysplasia: This is an early stage of precancerous changes where some cells are abnormal. Regular monitoring is essential, with an upper endoscopy every six to twelve months. If confirmed by an experienced pathologist, treatments like endoscopic resection (removal of damaged cells) or radiofrequency ablation (using heat to remove abnormal tissue) might be recommended.

High-grade Dysplasia: This is a more advanced stage, indicating a significant change in the esophagus lining and a higher cancer risk. Treatments aim to remove or treat the damaged tissue. Options include:

- Endoscopic Resection: Removal of the abnormal tissue using an endoscope.
- Radiofrequency Ablation: Uses radio waves to destroy the abnormal cells.
- Cryotherapy: Freezing the abnormal cells to destroy them.
- Surgery Involves removing and reconstructing the affected esophagus segment, often using the stomach or large intestine.

It's essential to note that recurrence of Barrett's esophagus is possible after treatment. Therefore, regular follow-up and possibly lifelong medication to reduce acid and promote esophagus healing might be necessary.

### **Regular Monitoring:**

Endoscopic surveillance is crucial regardless of the stage of Barrett's and the chosen treatment modality. This ensures early detection of changes in the esophagus lining, allowing for timely interventions. It is very important for the patients to follow their doctor's recommendations and return for periodic surveillance biopsies when instructed.

### **TissueCypher**

In addition to routine biopsies, some exciting new surveillance methods use artificial intelligence and machine learning to predict a patient's risk of developing high-grade dysplasia and/or esophageal cancer. One such service is TissueCypher. [TissueCypher](#) is the first AI-driven precision medicine test to determine a patient's risk of progression from Barrett's Esophagus to cancer. The molecular signatures identified by TissueCypher are powerful independent predictors of progression risk. The testing is performed on biopsies already taken at upper endoscopy. TissueCypher provides a risk score from 0 to 10, a risk class (low, intermediate, and high), and a five-year probability of progression to high-grade dysplasia (abnormal cell growth) or cancer. A low-risk test result is reassuring that current therapy and surveillance are sufficient. Patients with a high-risk TissueCypher score have an 18-fold higher risk of

progression than patients scoring low-risk. A high-risk test result enables increased surveillance or intervention to prevent progression to esophageal cancer.

### **Living with Barrett's Esophagus**

Being diagnosed with Barrett's esophagus might seem daunting, but it's manageable with the proper knowledge and medical guidance. People with Barrett's esophagus have an increased risk of esophageal cancer, but the risk is small, even in people with precancerous changes in their esophagus cells. Most people with Barrett's esophagus will never develop esophageal cancer. Regular monitoring, lifestyle adjustments, and timely medical interventions can ensure that the condition remains in check. While the risk of esophageal cancer looms, it's essential to remember that with early detection and appropriate management, most individuals with Barrett's esophagus lead healthy, fulfilling lives.

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## **Center For Digestive Health & Nutrition**

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