



## Review Article

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### A Quick Reference Guide for Gastro Esophageal Reflux Disease (GERD)

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#### Abstract

Gastro esophageal reflux disease results when the lower esophageal sphincter becomes weak or relaxes causing stomach contents to rise up into the esophagus. Refluxed stomach acid that touches the lining of the esophagus can cause heartburn. Also called acid indigestion, heartburn is an uncomfortable, burning feeling in the mid chest, behind the breastbone, or in the upper part of the abdomen. GERD is also associated with other symptoms like gastritis, esophagitis, respiratory problems like asthma, cough, oral and dental problems, sleep disturbances and Barrett's Esophagus and Cancer. GERD can be diagnosed by either of the methods like Barium Studies, Esophageal Manometry, pH Monitoring and Upper Endoscopy. Treatment for GERD may involve lifestyle changes, medications like Antacids, H<sub>2</sub> blockers and PPIs, or surgery depending on the severity of symptoms and also an alternative method using natural approaches. Even treatment with medication is also well established for treating GERD, it is an important consideration for patients to have access to alternative therapies and lifestyle modifications. Currently, research in this area is minimal and there is a need of more research activities in this way of treating GERD with natural medications.

**Keywords:** Esophageal sphincter, heartburn, Barrett's Esophagus, lifestyle modifications

#### Contents

1. Introduction . . . . .	1326
2. Diagnosis of Gerd. . . . .	1327
3. Pathophysiology and Associated Symptoms. . . . .	1327
4. Treatment & Management of Gerd. . . . .	1328
5. Alternative Treatment. . . . .	1249
6. Conclusion . . . . .	1330
7. References . . . . .	1330

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### 1. Introduction

Esophagus is the muscular tube that carries food and liquids from the mouth to the stomach. Gastro esophageal reflux disease results when the lower esophageal sphincter (the muscle that acts as a valve between the esophagus and stomach) becomes weak or relaxes when it should not, causing stomach contents to rise up into the esophagus[1]. Gastro esophageal reflux is the involuntary movement of gastric contents to the esophagus. gastro esophageal reflux is a normal physiological process that occurs several times a day without symptoms or damage of the esophageal mucosa in most otherwise healthy individuals. gastro esophageal reflux disease (GERD) is a

condition in which reflux of gastric contents into the esophagus produces frequent or severe symptoms that negatively affect the individual's quality of life or result in damage to esophagus, pharynx, or the respiratory tract [2]. GER is also called acid reflux or acid regurgitation because the stomach's digestive juices contain acid. Sometimes people with GER can taste food or acidic fluid in the back of the mouth. Refluxed stomach acid that touches the lining of the esophagus can cause heartburn. Also called acid indigestion, heartburn is an uncomfortable, burning feeling in the midchest, behind the breastbone, or in the upper part of the abdomen [1,2].

GERD can also cause cough or have asthma symptoms. It can also make individual voice sound hoarse and raspy. These symptoms can happen even in absence of heartburn condition. The acid may also leave a bitter taste in your mouth. This disease is associated with several other conditions, including Barrett's esophagus, esophageal carcinoma, gastritis, esophagitis, respiratory conditions, sleep disorders, and various ear-nose-throat (ENT) conditions [3]. Conventional treatment often includes the use of Antacids PPIs and other acid blockers. Natural therapies and lifestyle interventions are important to consider, owing to the chronic nature of GERD.

## 2. Diagnosis of Gerd

In the presence of typical symptoms of reflux disease, especially frequent heartburn and regurgitation of sour or bitter material, reflux treatment can be initiated without specific diagnostic testing. Diagnosis is required only when the patient presents with atypical symptoms, when the severity of reflux symptoms raises concerns about esophageal damage, when symptoms fail to respond to initial therapeutic intervention. GERD can be diagnosed by either of the methods like Barium Studies, Esophageal Manometry, pH Monitoring and Upper Endoscopy.

### Barium Studies:

A barium esophagram is an x-ray study in which the structure and function of the esophagus is evaluated. This study is usually the first test used in patients with dysphagia (difficulty swallowing). It is excellent for the diagnosis of a stricture or other causes of obstruction.

### Esophageal Manometry:

Esophageal manometry, also referred to as esophageal motility studies, involves the placement of a pressure sensitive catheter into the esophagus. The test permits evaluation of the strength and coordination of muscle contractions, as well as the strength and relaxation function of the LES. Manometry is usually used prior to esophageal pH studies to determine the level of the esophagus at which the pH probe should be placed [4].

### pH Monitoring:

Continuous pH monitoring, also called 24-hour pH studies, is a procedure in which the pH (or level of acidity) is recorded for a prolonged period. An acid-sensitive catheter is placed in the esophagus and is attached to a small monitoring device that records changes in esophageal pH over an extended period of time (up to 24 hours). It provides information on the severity and pattern of reflux. Continuous pH monitoring is considered the best test for the diagnosis of GERD [5].

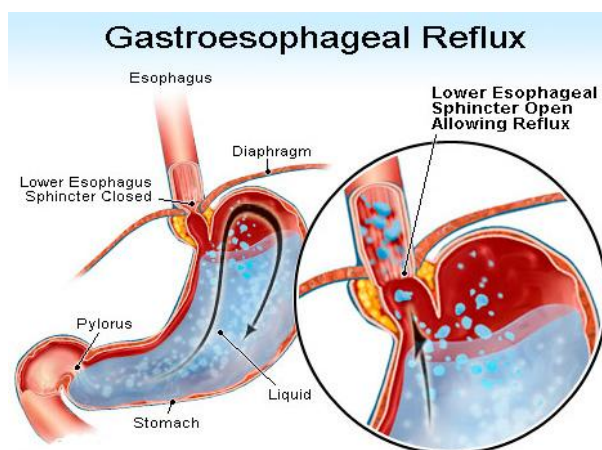
### Upper Endoscopy:

Upper endoscopy involves the examination of the lining of the esophagus, stomach, and first part of the small intestine with a flexible endoscope. It is not a particularly good test for the diagnosis of GERD, as most patients with GERD do not have esophageal injury and the documentation of reflux itself is neither reliable nor quantitative. On the other hand, endoscopy is the best test for the evaluation of reflux-induced esophageal injury [6].

## 3. Pathophysiology and Associated Symptoms

The pathophysiology of GERD is complex. Physiologic reflux (reflux in normal individuals) is generally brief in duration, relatively infrequent, and occurs almost exclusively after meals and is caused by a sudden relaxation of the LES that is not induced by swallowing. This type of relaxation, called transient spontaneous LES relaxation, is also the predominant mechanism of reflux in patients with GERD. However, whereas transient spontaneous relaxation is responsible for 98% of reflux events in normal individuals, it accounts for only about 60% of reflux events in patients with reflux.

Most other reflux events in patients with GERD occur when resting LES pressure is inadequate to resist the pressure within the stomach. Other factors contribute to the severity of reflux. Weak or uncoordinated esophageal contractions (perhaps occurring in response to esophageal irritation from reflux disease itself) delay esophageal clearance of refluxed material. This prolongs the duration of esophageal contact with refluxed digestive gastric contents. Saliva is an effective natural antacid. Reflux often stimulates salivation, a potentially beneficial response that enhances dilution and neutralization of refluxed gastric contents. If the rate of salivation is low, or if an individual is unable to swallow his own saliva, refluxed material remains in the esophagus for prolonged periods of time. This increases the severity of esophageal irritation and the probability of esophageal damage.



**Figure 1:** Reflux of gastric contents into the esophagus.

Numerous factors may influence the symptoms of GERD. Delayed gastric emptying, volume of gastric content, quantity and acidity of refluxed contents, ability of the esophagus to clear this material, LES function, and the resistance of the esophageal tissue can influence reflux symptoms [7]. Acid Reflux Symptoms: The most common symptom of GERD, heartburn, is experienced as a burning sensation in the center of the chest, which sometimes spreads to the throat; there also may be an acid taste in the throat.

#### **Gastritis:**

There is conflicting evidence regarding the role that *Helicobacter pylori* may play in GERD pathology. There are various studies that have looked at treatment of gastritis by eradicating *H. pylori* and the effects of treatment on concurrent GERD symptoms. The results of these studies vary from showing improvement to showing worsening of GERD symptoms [8]. Research regarding inflammation in the gastroesophageal junction, or cardia, has indicated that the presence of erosive GERD or *H. pylori* gastritis is associated with the inflammation [9].

#### **Esophagitis:**

Esophagitis is common with GERD and may be classified as erosive or non-erosive with its severity based on the number and location of mucosal breaks. Other types of esophagitis, such as eosinophilic esophagitis, present with similar symptoms as GERD and are commonly misdiagnosed. The common presentation of eosinophilic esophagitis is dysphagia and food impaction. Additional symptoms may include epigastric pain, emesis, weight loss, and failure to thrive [10].

**Respiratory Conditions:** Asthma is associated with the presence of GERD symptoms, and although the relationship has not been well-studied [11].

GERD is associated with a chronic nonproductive cough in some individuals; the cough occurs primarily during the day and while these patients are in an upright position. One study demonstrated that chronic cough was caused by reflux in 21% of cases [12].

Otitis media may also be linked to GERD. A study examining otitis media with effusion in adults demonstrated that pepsinogen concentration was higher in middle-ear effusion in patients who reported GERD symptoms [13].

Laryngeal symptoms may be associated with GERD. Often, they present as hoarseness, frequent throat clearing, a postnasal drip, excess phlegm, sore throat, dysphagia, a globus sensation, or cough. Chronic laryngitis and chronic sore throat are associated with GERD in as many as 60% of patients [14].

**Oral Health:** GERD has been shown to affect overall oral health. One study showed that children with GERD have increased dental erosion, salivary yeast, and salivary mutans streptococci compared with healthy children. In addition, research indicates that children with GERD have more dental caries and more severe erosion compared with healthy children [15].

**Sleep Apnea:** Sleep disturbance is common in individuals with GERD. Patients with obstructive sleep apnea (OSA) have GERD symptoms significantly higher than the general population [16].

**Barrett's Esophagus and Cancer:** Barrett's esophagus is a precancerous condition showing intestinal metaplasia of the lower esophagus and mucosecretory cells on histologic examination. It is the precursor to esophageal adenocarcinoma. Approximately 8%–10% of individuals with GERD have Barrett's esophagus. Risk factors for Barrett's esophagus include GERD for at least five years' duration, male gender, Caucasian race, and age over 50 [17].

## **4. Treatment & Management of Gerd**

Treatment for GERD may involve one or more of the following conventional strategies i.e., lifestyle changes, medications, or surgery depending on the severity of symptoms and also an alternative method using natural approaches.

## 1. Lifestyle Modification

Lifestyle modifications can have a great impact on GERD symptoms. Diet recommendations include avoiding foods that trigger symptoms. Common culprits include acidic foods, such as tomatoes, coffee, tea, and citrus foods. Additionally, avoidance of foods that decrease LES pressure, such as high-fat foods, chocolate, peppermint, smoking and alcohol, may be necessary [18].

Although most people only have heartburn for the two- to three-hour period after meals, some wake up at night with heartburn. People with nighttime heartburn can elevate the head of their bed, which raises the head and shoulders higher than the stomach, allowing gravity to prevent acid from refluxing [19].

Numerous studies have investigated the effect of weight loss on GERD symptoms. Research has indicated that weight loss and decreased visceral fat mass correlated significantly with decreased esophageal-acid exposure [20].

## 2. Medications

People can purchase many GERD medications without a prescription; however, people with persistent symptoms should still see a health care provider.

**Antacids**, are the over-the-counter medications usually recommend to relieve heartburn and other mild GERD symptoms. Antacids, however, can have side effects, including diarrhea and constipation [21].

**H2 blockers**, such as cimetidine, famotidine, nizatidine and ranitidine decrease acid production. H2 blockers provide short-term or on-demand relief and are effective for many people with GERD symptoms. They can also help heal the esophagus, although not as well as proton pump inhibitors [22].

**PPIs**, include omeprazole, lansoprazole, pantoprazole, rabeprazole and esomeprazole are the commonly used medications for the treatment of GERD. PPIs are more effective than H2 blockers and can relieve symptoms and heal the esophageal lining in most people with GERD. Health care providers most commonly prescribe PPIs for long-term management of GERD. However, studies show people who take PPIs long term or in high doses are more likely to have hip, wrist, and spinal fractures. People should take these medications on an empty stomach in order for stomach acid to activate them [23].

**Prokinetics**, which include bethanechol and metoclopramide help in making the stomach empty faster. However, both bethanechol and metoclopramide have side effects that often limit their use, including nausea, diarrhea, tiredness, depression, anxiety, and problems with physical movement. But these Prokinetics can interact with other medications [24].

**Antibiotics**, most commonly erythromycin, have been shown to improve gastric emptying. Erythromycin has fewer side effects than bethanechol and metoclopramide; however, like all antibiotics, it can cause diarrhea [25]. All of these medications work in different ways, so combinations of medications may help control symptoms. People who get heartburn after eating may take antacids and H2 blockers. The antacids neutralize stomach acid, and the H2 blockers stop acid production. By the time the antacids stop working, the H2 blockers have stopped acid production.

## 3. Surgery:

Surgery is required when a person cannot manage severe GERD symptoms through medication or lifestyle changes. Surgery is considered based on severity of disease, response to pharmaceutical treatment, risk of complications, and individual patient needs. Surgical treatment of GERD involves Laparoscopic fundoplication and Endoscopic techniques.

**Fundoplication:** It is an operation to sew the top of the stomach around the esophagus to add pressure to the lower end of the esophagus and reduce reflux. Laparoscopic fundoplication places a gastric wrap around the gastroesophageal junction, strengthening the barrier function. Research has indicated that fundoplication relieves heartburn and typical symptoms in 93% of patients, yet only 56% of individuals had relief of their atypical symptoms [26].

Endoscopic techniques, such as endoscopic sewing and radiofrequency, help control GERD in a small number of people. Endoscopic sewing uses small stitches to tighten the sphincter muscle. Radiofrequency creates heat lesions that help tighten the sphincter muscle. Surgery for both techniques requires an endoscope [27].

## 5. Alternative Treatment

### Antioxidants:

Antioxidants have been shown to be protective in numerous diseases, such as GERD, gastric ulcers, and GI cancers. Although studies directly supporting antioxidant supplementation with GERD are lacking, substantial evidence supports using antioxidant therapy for patients with gastric ulcers and cancer, and shows that the therapy may also provide benefit for patients who have GERD. Treatment of GERD with Antioxidants is based on the fact that Oxidative stress of the esophageal mucosa is a contributing factor in the pathology of GERD. Research has shown that the hormone and potent antioxidant melatonin prevented gastric ulceration and reduced endogenous hydroxyl radicals by 88%. In fact, melatonin was shown to be more effective than ranitidine for preventing stress-related ulcers in animal models [28]. A study was performed with an antioxidant dietary supplement containing melatonin, L-tryptophan, vitamin B6, folic acid, vitamin B12, methionine, and betaine. The supplement or omeprazole was given to individuals with GERD. In this study, 100% of individuals who took the supplement had complete regression of

their GERD symptoms within 40 days compared with less than 66% of individuals who had regression of symptoms treated with omeprazole [29].

**D-Limonene**, D-limonene is a monoterpene in citrus oil. Numerous studies have shown that D-limonene exerts anti-cancer, antimicrobial, and anti-inflammatory effects. In particular, studies have shown that this constituent of citrus oil is protective against GI cancers, including cancers of the stomach and colon, decreasing both growth and metastasis [30].

**Licorice:**

*Glycyrrhizaglabra* (licorice) root has historically been used as a demulcent and anti-inflammatory botanical for treating conditions such as gastric and duodenal ulcers. Studies have shown that ingestion of deglycyrrhizinated licorice (DGL) may increase mucous production and accelerate healing of duodenal and gastric ulcers [31].

Additionally some demulcent herbs also proven their effectiveness in treating GERD for their healing and soothing properties, including such herbs as *Aloe vera*, *Ulmusfulva*, and *Althaeaofficinalis* [32].

**Mastic:**

*Pistacialentiscus* (mastic) resin is used medicinally for treating duodenal and gastric ulcers. Animal studies show that it decreased *H. pylori* infection [33]. The antisecretory and cytoprotective activity of mastic may provide benefit for individuals with GERD, although direct evidence is lacking. Digestive Enzymes, Supplemental digestive enzymes may reduce GERD symptoms. Delayed gastric emptying and a large volume of food in the stomach are associated with GERD symptoms, and supplementation using digestive enzymes may reduce these factors. Digestive enzymes are commonly included in combination products, including lipase, amylase, protease, maltase, lactase, sucrase, phytase, and cellulose [34].

## 6. Conclusion

GERD is a chronic recurring condition that makes a great impact on the quality of life of individuals who have this condition. People with GERD can often reduce reflux by avoiding foods and drinks that worsen symptoms. Other dietary changes that can help reduce symptoms include decreasing fat intake and eating small, frequent meals instead of three large meals. People who are overweight can talk with a health care provider about dietary changes that can help them lose weight, which may decrease GERD symptoms. Even treatment with medication is also well established for treating GERD, it is important for patients to have access to alternative therapies and lifestyle modifications. Currently, research in this area is minimal and there is a need of more research activities in this way of treating GERD with natural medications.

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