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A REVIEW ARTICLE ON GASTROESOPHAGEAL REFLUX DISEASE (GERD)

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Abstract:

Gastroesophageal reflux disease (GERD) is a common clinical problem, affecting millions of people worldwide. Patients are recognized by both classic and atypical symptoms. Acid suppressive therapy provides symptomatic relief and prevents complications in many individuals with GERD. Advances in diagnostic and therapeutic modalities have improved our ability to identify and manage disease complications. Here, we discuss the pathophysiology and effects of GERD, and provide information on the clinical approach to this common disorder. Introduction Symptoms and complications that result from the reflux of stomach contents Gastroesophageal reflux disease (GERD) is a very common digestive disorder worldwide with an estimated prevalence of 18.1–27.8% in North America.Approximately half of all adults will report reflux symptoms at some time. According to the Montreal definition, GERD is a condition of troublesome synts into the esophagus. Diagnosis of GERD is typically based on classic symptoms and response to acid suppression after an empiric trial. GERD is an important health concern as it is associated with decreased quality of life and significant morbidity. Successful treatment of GERD symptoms has been associated with significant improvement in quality of life, including decreased physical pain, increased vitality, physical and social function, and emotional well-being. While GERD medications are not particularly expensive, the cost of treating GERD patients has been deemed 2-fold more costly than comparable individuals without GERD.This cost difference is likely due to higher morbidity in GERD patients and the higher cost of managing complications of inappropriately treated GERD.

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INTRODUCTION:

Gastroesophageal reflux disease (GERD) is a chronic gastrointestinal disorder characterized by the regurgitation of gastric contents into the esophagus. It is one of the most diagnosed digestive disorders in the US with a prevalence of 20%, resulting in a significant economic burden in direct and indirect costs and adversely affects the quality of life. GERD is caused by multiple different mechanisms that can be intrinsic, structural, or both, leading to the disruption of the esophagogastric junction barrier resulting in exposure of the esophagus to acidic gastric contents. Clinically, GERD typically manifests with symptoms of heartburn and regurgitation.[1]It can also present in an atypical fashion with extra-esophageal symptoms such as chest pain, dental erosions, chronic cough, laryngitis, or asthma. Based on endoscopic and histopathologic appearance, GERD is classified into three different phenotypes:non-erosive reflux disease(NERD), erosive esophagitis(EE), and Barrett esophagus(BE). However, medically refractory GERD is becoming increasingly common, requiring a tailored approach in the management of GERD.

Epidemiology and pathophysiology:

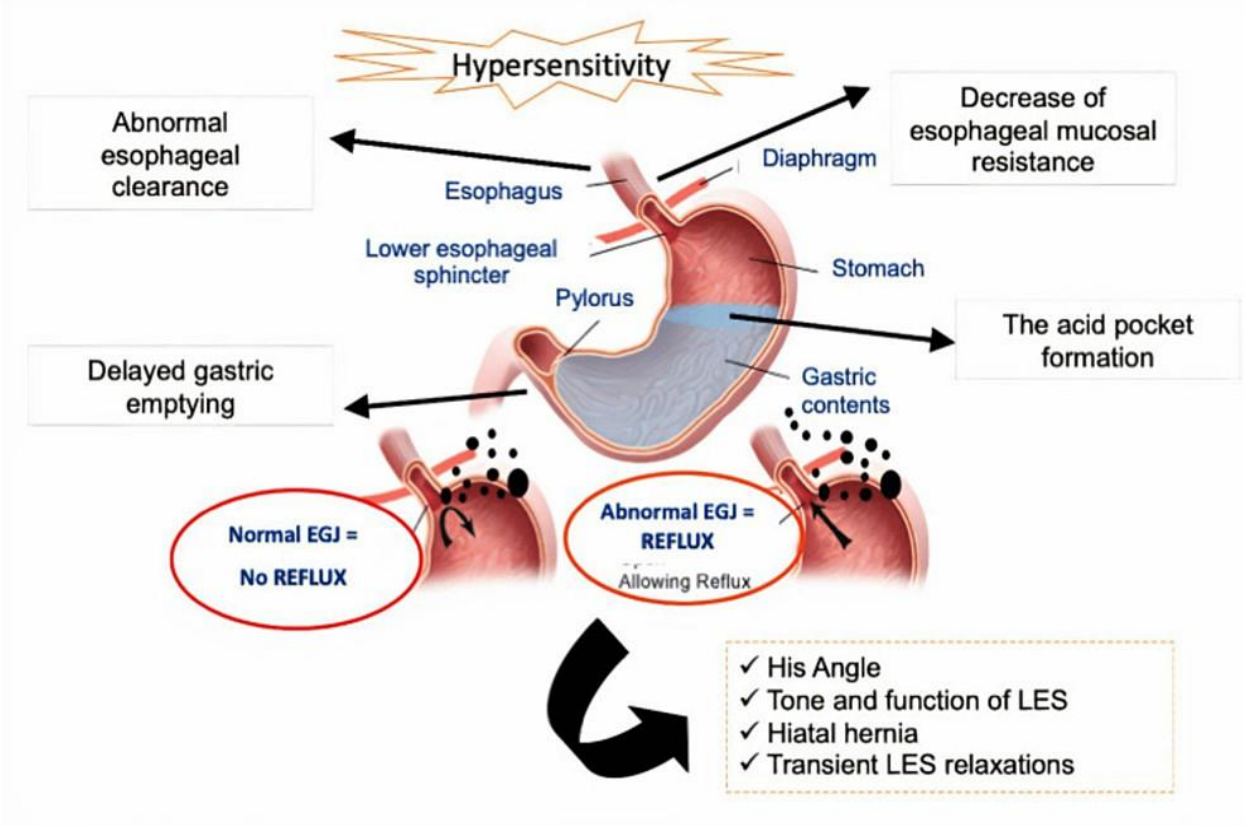
GERD is one of the most widespread gastrointestinal conditions, affecting 20% of adults in Western societies. However, because more people have access to over the counter acid reducing drugs, the actual prevalence of this illness may be higher. Males tend to have GERD at a slightly higher rate than females. In contrast to males who are more expected to have erosive esophagitis, females who arrive with GERD symptoms are more likely to have non-erosive reflux disease.. However compared to females, males have had a higher incidence of Barrett's esophagus with long term GERD symptoms.[2]

Older age, an immoderate body mass index (BMI), smoking, anxiety, stress or depression, and insufficient physical activity at work are risk factors for GERD. Consumption habits, for example the acidity of food to be consumed and the portion and the schedule of meals particularly with regard to sleep may also cause GERD.[3]

Recreational exercise appears to be protective except when done postprandially. Lower esophageal sphincter (LES) dysfunction is the leading cause of gastroesophageal reflux; however, other variables may also play a role in its onset. Physiologic and pathologic variables both have a role in the development of GERD. Transient lower esophageal sphincter relaxations (TLESRs) are the most frequent culprit.[4] TLESRs are short-lived, swallow-independent episodes of tone inhibition of the LES.[5] Even though they are physiological, they become more frequent in the postprandial period and are a significant cause of acid reflux in GERD patients. Other concerns include hiatal hernia, decreased esophageal clearance, delayed stomach emptying, and dropped LES pressure.

Risk factors for GERD include older age, excessive body mass index (BMI), smoking, anxiety/depression, and less physical activity at work. Eating habits may also contribute to GERD, including the acidity of food, as well as size and timing of meals, particularly with respect to sleep.[6] Recreational physical activity appears to be protective, except when performed postprandially. Have a look at the below diagrammatic representation for better understanding.

THE COMPLEX PATHOGENESIS OF GERD:



Symptoms

The classic and most common symptom of GERD is heartburn. Heartburn is a burning sensation in the chest, radiating toward the mouth, as a result of acid reflux into the esophagus. However, only a small percentage of reflux events are symptomatic. Heartburn is also often associated with a sour taste in the back of the mouth with or without regurgitation of the refluxate. Generally, GERD is a common cause of non-cardiac chest pain. It is important to distinguish between the underlying cause of the chest pain because of the potentially serious implications of cardiac chest pain and varied diagnostic and treatment algorithms based on etiology.A good clinical history may elicit GERD symptoms in patients with non-cardiac chest pain pointing to GERD as a potential etiology.[7] Although classic symptoms of GERD are easily recognized, extraesophageal manifestations of GERD are also common but not always recognized. Extraesophageal symptoms are more likely due to reflux into the larynx, resulting in throat clearing and hoarseness. It is not uncommon for patients with GERD to complain of a feeling of fullness or a lump in the back of their throat, referred to as globus sensation. The cause of globus is not well understood but it is thought that exposure of the hypopharynx to acid leads to increased tonicity of the upper esophageal sphincter (UES).Furthermore, acid reflux may trigger bronchospasm, which can exacerbate underlying asthma, thereby leading to cough, dyspnea, and wheezing. Some GERD patients may also experience chronic nausea and vomiting.[8]

It is important to screen patients for alarm symptoms associated with GERD as these should prompt endoscopic evaluation. Alarm symptoms may suggest a possible underlying malignancy. Upper endoscopy is not required in the presence of typical GERD symptoms. However, endoscopy is recommended in the presence of alarm symptoms and for screening of patients at high risk for complications (i.e. Barrett's esophagus, including those with chronic and/or frequent symptoms, age > 50 years, Caucasian race, and central obesity). Alarm symptoms include dysphagia (difficulty swallowing) and odynophagia (painful swallowing), which may represent presence of complications such as strictures, ulceration, and/or malignancy. Other alarm signs and symptoms include, but are not limited to, anemia, bleeding,

and weight loss. GERD symptoms should be considered as distinct from dyspepsia. Dyspepsia is defined as epigastric discomfort, without heartburn or acid regurgitation, lasting longer than one month. It can be associated with bloating/epigastric fullness, belching, nausea, and vomiting. Dyspepsia is an entity that may be managed differently from GERD and may prompt endoscopic evaluation, as well as testing for H. pylori. Dysphagia is an alert symptom in GERD patients and warrants an upper endoscopy. Patients with chronic heartburn frequently develop dysphagia, which usually worsens over time for meals.[9] Due to their healthy appetites, patients rarely lose weight. However, dysphagia is the initial sign of esophageal cancer but might also show up in Barrett's esophagus. The most typical causes of GERD are peptic stricture and severe inflammation.[10]
Complications

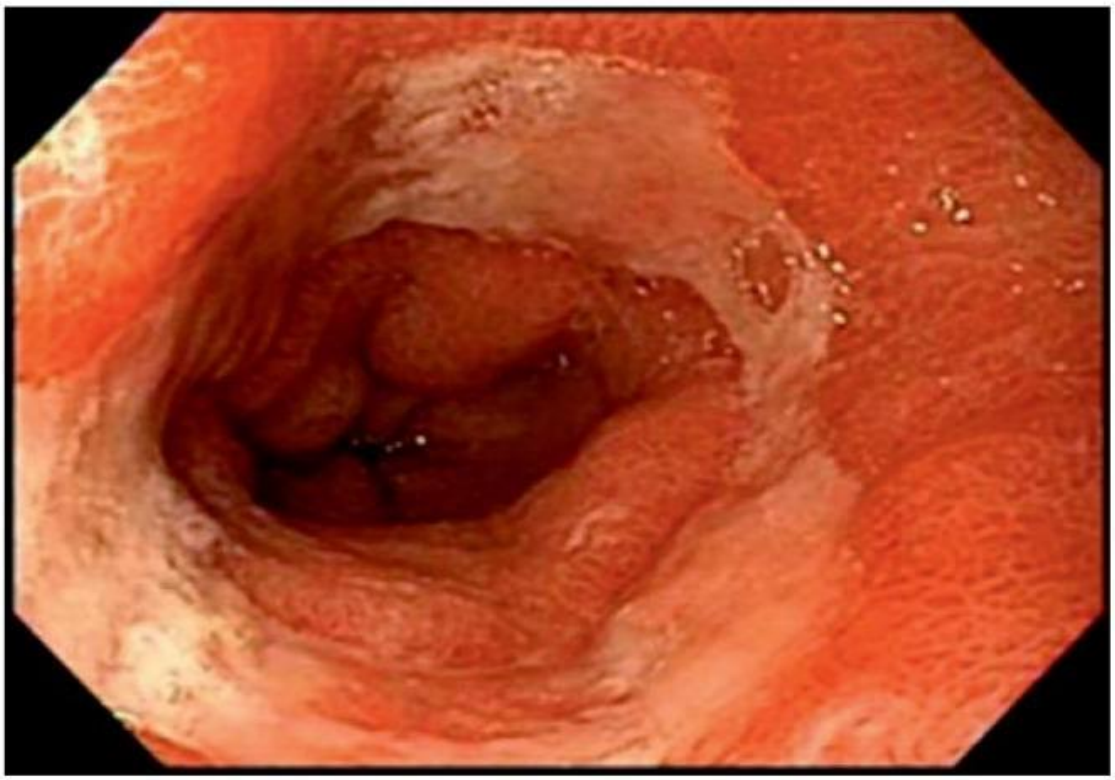
If left untreated, GERD can result in several serious complications, including esophagitis and Barrett's esophagus.

Esophagitis can vary widely in severity with severe cases resulting in extensive erosions, ulcerations and narrowing of the esophagus.

Esophagitis may also lead to gastrointestinal bleeding. Upper GI bleeding may present as anemia, hematemesis, coffee-ground emesis, melena, and w huhen especially brisk, hematochezia. [11

Chronic esophageal inflammation from ongoing acid exposure may also lead to scarring and development of peptic stricturesusually complaining the chief complaint of Dysphagia. Patients with persistent acid reflux may be at risk for Barrett's esophagus, defined as intestinal metaplasia of the esophagus.[12] In Barrett's esophagus, the normal squamous cell epithelium of the esophagus is replaced by columnar epithelium with goblet cells, as a response to acid exposure.

Changes of Barrett's esophagus may extend proximally from the gastroesophageal junction(GEJ) and have the potential to progress to (esophageal cancers) esophageal adenocarcinoma, making early detection very important in the prevention and management of malignant transformation.



Diagnosis

GERD is usually diagnosed clinically with classic symptoms and response to acid suppression. Heartburn with or without regurgitation is typically sufficient to suspect GERD, particularly when these symptoms are worse postprandially or when recumbent.The initiation of treatment with histamine 06 type 2 (H2) receptor blockers or proton pump inhibitors (PPIs) with subsequent cessation of symptoms is considered diagnostic. In patients who respond to empiric treatment, in the absence of alarm features or symptoms, no further workup is required. In some patients, reflux symptoms will persist despite treatment with high-dose PPIs.[13]

Additional tests may be warranted to evaluate for other causes of their symptoms and to screen for possible complications of GERD. It is important to note that the severity of reflux symptoms does not necessarily correlate with the extent of mucosal damage.[14]The most utilized diagnostic test for the evaluation of GERD and its possible complications is the upper gastrointestinal endoscopy, or esophagogastroduodenoscopy (EGD). The primary benefit of endoscopy is direct visualization of the esophageal mucosa. This assists in diagnosis of complications of GERD such as esophagitis, strictures and Barrett's esophagus One endoscopic grading system of GERD severity is the Los Angeles classification, graded from A to D, with D being the most severe. The referral image of endoscopy is affixed below. [15]

Figure:1 Image of Endoscopy view of los angeles grade D esophagitis.

Ambulatory pH monitoring is considered the gold standard in the diagnosis of acid reflux. Ambulatory pH monitoring allows for the objective detection of acid reflux events and correlation with symptoms (below image).This is particularly helpful in symptomatic patients with normal endoscopic findings. Ambulatory pH testing can be completed with good reproducibility (84–93%), sensitivity (96%), and specificity (96%).To complete the test, pH probes (catheter or wireless capsule) are placed into the esophagus for 24 to 48 hours. Percent of time with an esophageal pH of less than 4 is the primary parameter used in the diagnosis of GERD. It has the benefit of detecting dynamic changes in pH while upright and recumbent. Furthermore, pH probes record the number of reflux events, the proximal extent of reflux, as well as the duration of reflux events. Symptom correlation is also noted between reflux and symptoms. This test can be performed on or off PPI therapy.

Figure 2:

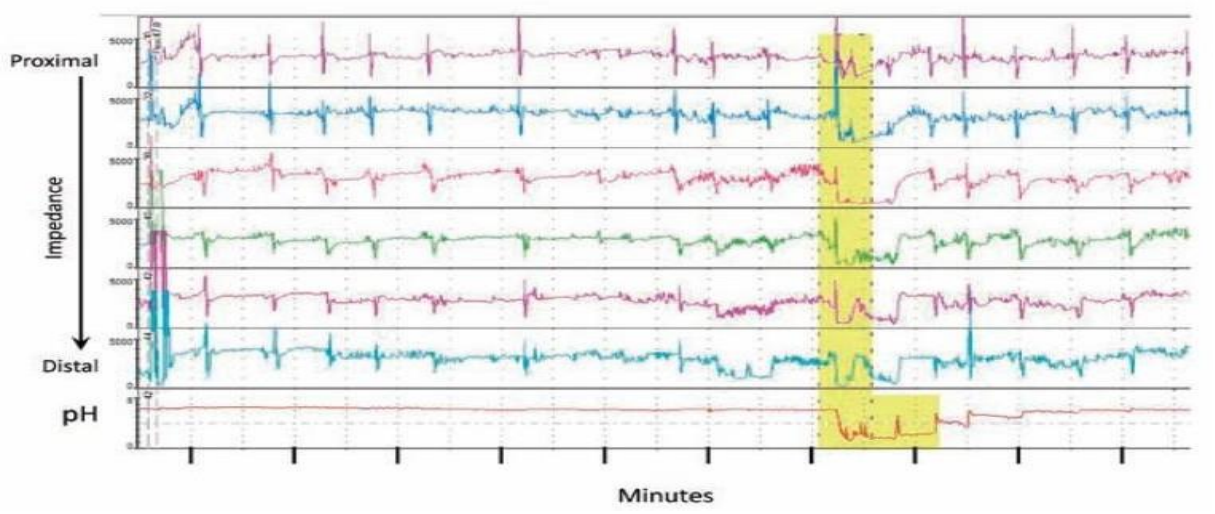


Figure.2: High resolution esophageal impedance and pH tracings. Impedance within the lumen of the esophagus is measured simultaneously using multiple probes and the measurements are displayed with the proximal measures at the top progressing distally towards the stomach. The bottom tracing is the pH at the most distal measurement point. Highlighted in yellow are measurements that document liquid reflux from the stomach correlating with a drop in pH indicating reflux of gastric acid. this tracing is a small snapshot of 24 hours of data.

The diagnostic yield of ambulatory esophageal pH testing can be improved with the addition of impedance testing in patients with suspected GERD (below image). This test involves the same procedure of placing probes into the esophagus but measures electrical properties of esophageal contents. For example, liquid reflux has low impedance and high conductance while gaseous reflux, seen in belching, has high impedance with low conductance. Some patients sense reflux symptoms during times of both normal and excessive esophageal acid exposure and combination monitoring allows for detection of nonacid reflux events that would otherwise go unnoticed with pH monitoring alone. While it has some utility in evaluating patients with dysphagia, the barium esophagram is a poor screening test for GERD.[16] It has a very poor sensitivity (26%) and specificity (50%) for mild esophagitis compared to endoscopy. Reflux of barium often does not correlate well with reflux of acid in symptomatic patients, and in up to 20% of cases is positive in normal individuals.Sensitivity can be improved by using maneuvers to elicit reflux such as coughing, valsalva, and rolling from supine to the right lateral position.Fluoroscopy barium testing has better yield in the detection of severe esophagitis, peptic strictures, and hiatal hernia. However, even for this indication, it still carries a relatively poor sensitivity and specificity for the detection of acid reflux in comparison to ambulatory pH testing. Therefore, due to its poor utility, it is not recommended for routine diagnosis of GERD.[17]

The clinical history is the primary basis for GERD diagnosis. The account must pinpoint the distinctive signs and symptoms, their occurrence, frequency, intensity, aggravating and relieving events, progression through time, and effects on quality of life.

Manifestations of GERD

Typical manifestations	Atypical manifestations		
	Pulmonary	Otorhinolaryngological	Oral
Dyspepsia, Regurgitation of acid	Wheezing (chronic), Inflammation of the pharynx, Throat clearing, Pneumonia, Bronchiectasis, Asthma	Sore throat, Otitis, Inflammation of sinuses	Tooth erosion, Halitosis, Aphtha

Few other Different types of diagnostic techniques

Typical, atypical, and extra-esophageal symptoms can be used to categorize the disease's manifestations. Acid regurgitation and heartburn have the highest specificity for GERD.[18] These symptoms can help one make a presumptive diagnosis and start empiric therapy in the absence of alarming symptoms. In some cases, additional diagnostic testing is required to confirm the diagnosis and to look for consequences or other potential explanations of the symptoms.

- High Digestive Endoscopy
- Radiological Esophageal Examination
- Computerised Esophageal Manometry.
- Esophageal Scintigraphy
- Long-term Esophageal pH Monitoring
- Long-Term Wireless Esophageal pH Monitoring (BravoCapsule)
- Bernstein Test Esophageal Impedanciometry Therapeutic Trials.

High Digestive Endoscopy
This specific test is the one used most often to evaluate GERD symptoms in people over 40 who have alarming symptoms, for example, difficulty in swallowing, painful swallowing, loss of weight, gastrointestinal bleeding, an urge to vomit (nausea), vomiting, and a history of malignancy in the family. It enables the detection of additional conditions that exhibit symptoms similar to dyspepsias, such as ulcers, especially gastric ulcers, moniliasis of the esophagus, carcinoma of the stomach, and eosinophilic inflammation of the esophagus. It also enables erosions to be observed. It also makes erosions, ulcers, Barrett's esophagus, and peptic stenosis visible. The severity of reflux esophagitis has been categorized in several ways. The Los Angeles classification is the most often used[mentioned above].[19]

Radiological Esophageal Examination
In diagnosing GERD, this specific examination has limited reactivity and accuracy. It should be requested when the affected individual complains of difficulty swallowing and painful swallowing because it enables a morphological assessment of the esophagus, depicts the presence of stenosis, and identifies a state like a slipping hiatus hernia and an atypical gastroesophageal angle that favours gastroesophageal reflux.[20]

Computerized Esophageal Manometry
Esophageal manometry does not serve as a diagnostic tool. Still, it does offer valuable data for assessing esophageal sphincters' pressure tonus and the activity (motor) of the esophageal body part. It can be used to forecast how GERD will develop in the future. The identification and prognosis of critical hypotonia of reduced esophageal detrusor suggest therapeutic continuance therapy, surgery, or fundoplication.

Esophageal Scintigraphy
This examination demonstrates GERD caused by technetium-marked contrast consumption. The diagnosis of GERD in children can be made using this non-invasive method. However, this examination is costly and only offered in select high-tech centres.

Long-term Esophageal pH Monitoring
This exam determines the diagnosis and severity of GERD in addition to its pattern, such as whether it is prone, positional, or orthostatic. A number of circumstances call for this examination. To diagnose GERD and laryngopharyngeal reflux disease, it is recommended to use a catheter which should at least have two sensorial, one at the far end esophagus and the other at the esophageal detrusor, the upper one or higher. Other recommended procedures are

a) GERD prognosis in typical further up endoscopy
b) character of the pattern of gastroesophageal reflux
c) acid benefaction.

The identification of reflux disease, which is non-erosive, is found in the individuals with standard pH levels and reacts favourably to proton pump inhibitors (PPIs). A patient with regular pH readings, a low symptom score, and an inability to respond to PPI is another common scenario that points to the diagnosis of functional heartburn.

Long-Term Wireless Esophageal pH Monitoring (Bravo Capsule)

The benefits of this approach include higher patient comfort, prolonged esophageal pH monitoring (up to 96 hours), and the additional use of preventing catheter shift, which can happen with conventional pH metres. Azzar et al., in 2012, concluded that both the standard and the esophageal pH-metre (wireless) techniques could diagnose pathological gastroesophageal reflux.

Bernstein Test
The esophageal mucosa is supplied and imbued with a diluted hydrochloric acid solution in this provocative test. Around 80% sensitivity and specificity are correlated with the onset of symptoms during perfusion. GERD cannot be quantified due to the solely qualitative results. Since the invention of the 24-hours esophageal pH-metre, it has ceased to be utilised.

Esophageal Impedanciometry
This novel technique illustrates the refluxate's antegrade and retrograde motions. It assesses the refluxate's physical,and synthetic characteristics in conjunction with pH-meter. Consequently, this survey characterizes the type of refluxate as well as whether it is acidic or not. Non-acidic reflux diagnosis in patients who don't respond to PPI is a sign that they need surgery because the fundoplication procedure removes a couple of varieties of reflux.

Therapeutic Trials
PPI complete doses may be given for a month together with behavioral treatments to affected individuals below 40 years of age with usual GERD symptoms and no distress or alarm indications.The test is deemed positive when the symptoms go

away, and there is a strong indication of GERD.

Treatment

There are a couple of curative ways through which one can proceed towards GERD, clinical and surgical, the preference of which relies on the affected individual's attributes (lifespan, therapeutic adherence, personal inclination, and underlying comorbidity) and components such as medical care reaction, underlying esophageal mucosal erosions, unusual manifestations, and impediments.

General approach to treatment of GERD

The treatment of GERD is categorized into one of the following modalities:

- lifestyle changes and patient-directed therapy with antacids, nonprescription H2-receptor antagonists, and/or nonprescription proton pump inhibitors.
- pharmacologic intervention primarily with standard or high-dose acid-suppressing agents. The interventional therapies (antireflux surgery or endoluminal therapies).
- The initial therapeutic modality used is in part dependent on the patient's conditions.

Historically, a step-up approach has been used, starting with noninvasive lifestyle modifications and patient-directed therapy, and progressing to pharmacologic management or interventional approaches.6,8,9 A step-down approach, starting with a proton pump inhibitor given once or twice daily instead of an H2-receptor antagonist, and then stepping down to Esophageal clearance Esophageal mucosal resistance **Bethanechol Cisapride** (limited access) **Alginic acid Sucralfate** LES pressure **Bethanechol Metoclopramide Cisapride Gastric emptying** [limited access] Metoclopramide Cisapride (limited access) Gastric acid Antacids H2 receptor antagonists (Cimetidine, famotidine, nizatidine, ranitidine) Proton pump inhibitors Lansoprazole Omeprazole Pantoprazole Rabeprazole.[21

Therapeutic interventions in the management of gastroesophageal reflux disease. Pharmacologic interventions are targeted at improving defense mechanisms or decreasing aggressive factors. (LES, lower esophageal sphincter.) TREATMENT DESIRED OUTCOMES Therapeutic modalities used in the treatment of gastroesophageal reflux are

- Targeted at reversing the various pathophysiologic abnormalities. The goals of treatment are to alleviate or eliminate the patient's symptoms.[22]
- Decrease the frequency or recurrence and duration of gastroesophageal reflux promote healing of the injured mucosa prevent the development of complications.
- Therapy is directed at augmenting defense mechanisms that prevent reflux and/or decrease the aggressive factors that worsen reflux or mucosal damage.

➡Specifically, therapy is directed at decreasing the acidity of the refluxate

➡ decreasing the gastric volume available to be refluxed; (c) improving gastric emptying

➡increasing LES pressure

➡ enhancing esophageal acid clearance

➡ protecting the esophageal mucosa.The lowest degree of acid suppression needed to control symptoms, is also effective. Neither the "step-up" nor "step-down" approach has superior efficacy or cost effectiveness over the other. The clinician should determine the most appropriate approach for an individual patient.Whichever method is used, every attempt should be made to aggressively control symptoms and to prevent relapses early in the course of the patient's disease in order to prevent the complications that are seen with long-standing symptomatic GERD.In patients with moderate to severe GERD, starting with a proton pump inhibitor as initial therapy is advocated because of its superior efficacy over H2-receptor antagonists. Dietary and lifestyle modifications and education about factors that may worsen GERD symptoms should be discussed with the patient. lists many of the lifestyle changes that are included in phase I therapy.Although most patients do not respond to lifestyle changes alone, the importance of maintaining these lifestyle changes throughout the course of GERD therapy should be stressed to the patient on a routine basis, no matter what other therapeutic modality is used. Patients with mild or infrequent symptoms may see improvement with the inexpensive nonprescription H2- receptor antagonists, antacids, or alginic acid.

- After 2 weeks, if patients are not responding to lifestyle changes and to patient-directed therapy, they are generally started on a pharmacologic treatment regimen consisting of an acid-suppressing agent. **Acid-suppressing therapy with proton pump inhibitors or H2-receptor antagonists are the mainstay of GERD treatment**.Patients presenting with more

- severe symptoms (with or without esophageal erosions) or with erosive esophagitis should be started on a proton

pump inhibitor as initial therapy, because it provides the most rapid symptomatic relief and healing of esophagitis in the highest percentage of patients.H2-receptor antagonists in divided doses are effective in patients with mild GERD.

- Patients not responding to standard doses of H2-receptor antagonists may require higher doses and/or more frequent dosing, because improvement correlates with the extent and duration of acid suppression.
- Standard H2-receptor antagonist doses may be increased to two to four times the normal dose. If this is necessary, it is more cost effective to switch to a proton pump inhibitor. Prokinetic agents offer an alternative to standard doses of **H2-receptor antagonists** in mild to moderate non erosive GERD, but may not be as effective as acid-suppressing agents and can be more expensive.
- Combining prokinetic agents with acid-suppressing drugs offers only modest improvements in symptoms over standard doses of H2-receptor antagonists and should not be routinely recommended. These agents improve defects related to esophagogastric motility, such as decreased LES pressure, decreased esophageal clearance, or delayed gastric esophageal effect.
- Unfortunately, the availability of a prokinetic agent that has an acceptable adverse effect
- profile is lacking.**Cisapride** has been removed from the market for general use because of reports of cardiac arrhythmias (torsades de pointes) and is currently available only through a limited access program from the manufacturer. For this reason, it is no longer routinely used in managing patients with GERD. The use of other prokinetic agents such as **metoclopramide** and **bethanechol** is limited by their adverse effect profile. Mucosal protectants such as sucralfate have a very limited role in the treatment of GERD.[23]

Patient Presentation	Recommended Treatment Regimen	Comments
Phase I		
Intermittent, mild heartburn	A. Lifestyle Changes **PLUS** B. Antacids • Maalox or Mylanta 30 mL as needed or after meals and at bedtime • Maalox TC 5–10 mL as needed or after meals and at bedtime • Gaviscon 2 tabs after meals and at bedtime • Calcium carbonate (500 mg) 2–4 tablets as needed **AND/OR** C. Low-dose OTC H_2-receptor antagonists (each taken up to twice daily) • Cimetidine 200 mg • Famotidine 10 mg • Nizatidine 75 mg • Ranitidine 75 mg **OR** OTC proton pump inhibitor (taken once daily) • Omeprazole 20 mg	Lifestyle changes should be started initially and continued throughout the course of treatment. If symptoms are unrelieved with lifestyle changes and OTC medications after 2 weeks, begin pharmacologic therapy (phase II therapy).
Phase II		
Symptomatic relief of GERD	A. Lifestyle modifications **PLUS** B. Standard doses of H_2-receptor antagonists for 6–12 weeks • Cimetidine 400 mg twice daily • Famotidine 20 mg twice daily • Nizatidine 150 mg twice daily • Ranitidine 150 mg twice daily **OR** B. Proton pump inhibitors for 4–8 weeks. All are given once daily. • Esomeprazole 20 mg • Lansoprazole 15 mg • Omeprazole 20 mg • Pantoprazole 40 mg • Rabeprazole 20 mg	For typical symtoms, treat empirically with phase II therapy. Mild GERD can usually be treated effectively with H_2-receptor antagonists. Patients with moderate to severe symptoms should receive a proton pump inhibitor as initial therapy. If symptoms are relieved, treat recurrences on an as-needed basis. If symptoms recur frequently, consider maintenance therapy (MT) with the lowest effective dose. Note: Most patients will require standard doses for MT.
Healing of erosive esophagitis or treatment of patients presenting with moderate to severe symptoms or complications	A. Lifestyle modifications **PLUS** B. Proton pump inhibitors for 4–16 weeks (up to twice daily) • Esomeprazole 20–40 mg daily • Lansoprazole 30 mg daily • Omeprazole 20 mg daily • Rabeprazole 20 mg daily • Pantoprazole 40 mg daily **OR** B. High-dose H_2-receptor antagonist for 8–12 weeks • Cimetidine 400 mg four times daily or 800 mg twice daily • Famotidine 40 mg twice daily • Nizatidine 150 mg four times daily • Ranitidine 150 mg four times daily	For atypical symtoms, obtain endoscopy (if possible) to evaluate mucosa. Give a trial of a proton pump inhibitor or an H_2-receptor antagonist. If symptoms are relieved, consider MT. Proton pump inhibitors are the most effective maintenance therapy in patients with atypical symptoms, complicated symptoms, and erosive disease. Patients not responding to phase II therapy, including those with persistent atypical symptoms, should be evaluated via ambulatory 24-hour pH monitoring to confirm the diagnosis of GERD (if possible). If GERD is present, consider phase III therapy.
Phase III	Interventional therapies (antireflux surgery or endoluminal therapies)	Manometry should be performed in anyone who is a candidate for surgery.

Therapeutic approach to GERD

In these cases, the diagnosis should be confirmed through further diagnostic tests before long-term, high-dose therapy or interventional approaches (antireflux surgery or endoluminal therapies) are considered. Interventional approaches may also be considered a maintenance option in certain patients with established GERD.

NONPHARMACOLOGIC THERAPY

Nonpharmacologic treatment of GERD includes lifestyle modifications, which should be started initially and continued throughout the treatment course for GERD, and interventional approaches (antireflux surgery or endoluminal therapies).

Lifestyle modifications

The most common lifestyle changes that a patient should be educated about include NONPHARMACOLOGIC THERAPY Nonpharmacologic treatment of GERD includes lifestyle modifications, which should be started initially and continued throughout the treatment course for GERD, and interventional approaches (antireflux surgery or endoluminal therapies).

Lifestyle modifications The most common lifestyle changes that a patient should be educated about include

(a) weight loss
(b) elevation of the head of the bed
(c) eating smaller meals and avoidance of eating 3 hours prior to sleeping
(d) avoidance of foods or medications that exacerbate GERD
(e) smoking cessation; and.
(f) avoidance of alcohol. Obese patients were 2.8 times more likely to experience GERD symptoms than patients who were not obese.

While there are limited data indicating that reflux occurs more often with obesity, it would seem logical that the increased intra-abdominal pressure and dietary habits of obese patients would predispose them to reflux. Therefore weight loss and a low-fat diet is recommended.A meal high in fat will decrease LES pressure for 2 hours or more postprandially. In contrast, a high-protein, low-fat meal will elevate LES pressure. Elevating the head of the bed about 6 to 8 inches with a foam wedge under the mattress (not just elevating the head with pillows) decreases nocturnal esophageal acid contact time and should be recommended.[24]

Many foods may worsen the symptoms of GERD. Fats and chocolate can decrease LES pressure, while citrus juice, tomato juice, coffee, and pepper may irritate damaged endothelium. It is important to evaluate patient profiles and to identify potential medications that may exacerbate GERD symptoms.

Medications, such as **anticholinergics, barbiturates, calcium channel blockers**, and **theophylline** decrease **LES pressure**. Other medications including **aspirin, iron, NSAIDs,quinidine, potassium chloride**,and **bisphosphonates** act as direct contact irritants to the esophageal mucosa. Patients taking **bisphosphonates (e.g., alendronate)** should be instructed to drink 6 to 8 ounces of plain tap water and remain upright for at least 30 minutes following administration. Proper patient education can help prevent dysphagia or esophageal ulceration.

Patients should be closely monitored for worsening symptoms when any of these medications are started. If s A meal high in fat will decrease LES pressure for 2 hours or more postprandially. In contrast, a high-protein, low-fat meal will elevate LES pressure. Elevating the head of the bed about 6 to 8 inches with a foam wedge under the mattress (not just elevating the head with pillows) decreases nocturnal esophageal acid contact time and should be recommended.

INTERVENTIONAL APPROACHES

Antireflux Surgery 6 Surgical intervention is a viable alternative for selected patients with well-documented GERD.The goal of antireflux surgery is to re-establish the antireflux barrier, to position the lower esophageal sphincter within the abdomen where it is under positive (intra-abdominal) pressure, and to close any associated hiatal defect.

It should be considered in patients

(a) who fail to respond to pharmacologic treatment
(b) who opt for surgery despite successful treatment because of lifestyle considerations, including age, time, or expense of medications
(c) who have complications of GERD (BE, strictures, or grade 3 or 4 esophagitis)or
(d) who have atypical symptoms and reflux documented on 24-hour ambulatory pH monitoring.

Surgical procedures include Nissen, Belsey, Toupet, and Hill fundoplication operations.

The procedure chosen depends on the surgeon's expertise and preference, as well as on anatomic considerations. In general, 90% of patients have symptom resolution following successful open Nissen fundoplication.Because

of the diminished surgical complications with the newer laparoscopic surgical procedures (Nissen fundoplication being one of the most commonly performed procedures), the role of surgery in the long-term management of GERD has become more appealing.

The major complications with antireflux surgery include gas bloat syndrome (inability to belch or vomit), dysphagia, vagal denervation, splenic trauma, and very rarely, death.In contrast, death has not occurred due to pharmacologic treatment with a proton pump inhibitor.

Antireflux surgery has been found to be superior to medical management (with an H2-receptor antagonist or prokinetic agent). However, similar comparisons with proton pump inhibitors are lacking.

A preliminary study of 310 patients who were initially controlled on **omeprazole 40 mg** daily found antireflux surgery to be slightly superior to omeprazole 20 mg daily at 3 years. **Omeprazole doses** of 40 to 60 mg were found to be equally efficacious to antireflux surgery. Long-term effectiveness of antireflux surgery ranges from 5 to 20 years.CLINICAL CONTROVERSY Some clinicians believe that patients should be offered the newer endoscopic interventions instead of proton pump inhibitors for long-term maintenance of GERD.

While the newer endoscopic therapies provide good results and less recovery time than surgery, the long-term effects are still not known. Conversely, many patients prefer not to have to take medication indefinitely, and in some cases still complain of symptoms despite drug therapy.

Endoluminal Therapies Several new endoluminal approaches to the management of GERD have recently been developed.These techniques include endoscopic suturing to produce a plication, endoluminal application of radiofrequency heat energy resulting in tissue injury or nerve ablation (the Stretta procedure), and endoscopic injection of a biopolymer known as Enteryx at the gastroesophageal junction. These techniques are relatively new, and although FDA-approved, their exact role in the management of GERD has yet to be determined.

Endoscopic gastro plastic plication of folds of the gastroesophageal junction is accomplished using a suturing device introduced by mouth with endoscopic assistance, and it enhances the barrier function of the gastroesophageal junction.Preliminary reports suggest that following the procedure there is a significant reduction in symptoms of heartburn and regurgitation, and that the quality-of life scores improve.

There has been a reported reduction in the use of other acid-suppressing medications such as proton pump inhibitors in the population treated. The Stretta device delivers radiofrequency energy through specialized needles placed into the submucosal tissue of the esophagus while monitoring esophageal mucosal surface temperatures.
This results in tissue injury leading to increased collagen deposition and scarring at the gastroesophageal junction, potentially increasing LES pressure and reducing gastroesophageal reflux.

Again, the primary outcome has been reduction in symptomatic heartburn and improvement in quality of life. Although acid exposure time was reduced, proton pump inhibitor use continued in approximately 15% of patients at 6 months, and 30% of patients at 12 months. Because of the paucity of sufficient study data, it is unclear what the role of this device will be in the management of patients with symptomatic GERD.

Therapy of gastroesophageal reflux through injection of bulking agents into the gastroesophageal junction has been tried using bovine collagen or polytetrafluoroethylene.

More recently, the injection of ethylene vinyl alcohol copolymer (Enteryx) has been approved by the FDA for the treatment of GERD. In this technique, the polymer is injected through a needle placed through the endoscope into the tissue at the esophagogastric junction.The exact mechanism of action for this technique is not known, although reduction in transient LES pressure has been demonstrated.

The overall safety of this procedure has been excellent with no major complications being reported. Among the 70% to 80% of treated patients who responded, most were able to discontinue proton pump inhibitor use.

Pharmacological Treatment
Different medications can be used to treat GERD. PPIs are the preferred medications because they prevent the stomach parietal cells from producing acid, which lessens the acid's ability to irritate the

esophagus. **Omeprazole** is the most popular. The initial therapy of choice is total PPI dosages for four to eight weeks. A double dose should be administered once before the morning meal and once before the night meal if the patient's symptoms do not disappear. Prokinetic medications and histamine H2 receptor antagonists are regarded as second-line medications.[25]

H2 blockers work by inhibiting parietal cells' **histamine H2 receptors** and lowering acid excretion. **Ranitidine, famotidine, cimetidine, and nizatidine** are the most widely used. **Prokinetic** medications speed up stomach unloading but have non-existing results on the momentary loosening of the distal esophageal sphincter. **Domperidone** and **metoclopramide** are the most popular. When there is gastroparesis, they must be prescribed**. Alginate** and **sucralfate antacids** could be recommended if the outpatient experiences adverse reactions from PPI or histamine H2 sensory receptor antagonists to relieve their symptoms temporarily.

Due to these medications' teratogenic effects, pregnant women need to get special treatment. Behavioural interventions must be emphasised, and medicines with systemic absorption should not be used. An antacid regimen is advised. Histamine H2 receptor antagonists may be administered if the symptoms continue.

Since most medications are eliminated in milk, only its use among systemic agents is safe during lactation. Between 20% to 42% of patients who receive PPI for the treatment of GERD do not respond to it satisfactorily; this condition is referred to as refractory GERD. **Moraes Filho** states that functional heartburn, non-adherence to therapy, insufficient instructions, variations in the genetic constitution, alkaline gastroesophageal reflux, autoimmune disorders, eosinophilic esophagitis, and wrong diagnosis are the main reasons for refractory GERD. The author speculates that hypersensitivity could be related to GERD, which occurs between the clinical manifestations and exacerbates the signs. **Amitriptyline,** other **tricyclic antidepressants,** and **serotonin** reuptake inhibitors may be prescribed to treat this disease.

Surgical Treatment

Patients who require ongoing medication, resist protracted treatment, or have complex forms of GERD might consider surgery. Given the potential intervention of PPI in calcium ion uptake, Herbella and Patti argued that interventional therapy should also be designated for adult females going through menopause and those who might be suffering from osteoporosis. Not managing symptoms but maintaining patients' long-term asymptomaticity is the main challenge in clinical treatment.

According to Nissen, 1956, the surgical procedure entails creating an anti-esophageal reflux valve utilising the fundus of the stomach (fundoplication). It corrects an anatomical deficiency by minimising the sliding hiatal hernia seen in 89% of patients suffering from pathological GERD. Furthermore, experimental and clinical studies have shown that it recovers LES competence.Three surgical treatments for GERD are used most frequently, i.e., total fundoplication, in which the esophagus is entirely encircled (360°), partial fundoplication (Toupet), and assorted fundoplication, developed by **Brandalise** and **Aranha**.

The decrease in pain experienced after the surgery, quick recovery, early discharge from the hospital, quick integration of everyday undertakings and getting back to jobs, positive aesthetic aspects, and minimum lifestyle modification stand out among the many benefits of video-laparoscopic fundoplication.

Additionally, the smaller incision and little postoperative discomfort enable quick diaphragm recovery and early patient deambulation, reducing the risk of respiratory problems.[look at the below fig.].

Brandalise and Aranha's fundoplication procedure

MAINTENANCE THERAPY

Although healing and/or symptomatic improvement may be achieved via many different therapeutic modalities, a large percentage of patients with gastroesophageal reflux will relapse following discontinuation of therapy, especially those with more severe disease.Follow-up studies indicate that 70% to 90% of patients will relapse within 1 year of discontinuation of therapy, regardless of what therapeutic regimen had been used to induce remission.

Patients who have symptomatic relapse following discontinuation of therapy or lowering of dose, including patients with complications such as BE, strictures, or hemorrhage, should be considered for long-term maintenance therapy to prevent complications or worsening of esophageal function.

The goal of maintenance therapy is to P1: FCH/FFX P2: FCH/FFX QC: FCH/FFX T1: FCH GB109-32 March 2, 2005 21:35 624 SECTION 4 GASTROINTESTINAL DISORDERS improve quality of life by controlling the patient's symptoms and preventing complications. These goals cannot generally be achieved by decreasing the dose of the therapeutic modality used for initial healing or switching to a less potent acid-suppressing agent.[26]

Most patients will require standard doses to prevent relapses. Patients should be counseled on the importance of complying with lifestyle changes and long-term maintenance therapy in order to prevent recurrence or worsening of disease.H2-receptor antagonists may be effective maintenance therapy for patients with mild disease. Although cisapride was an effective maintenance therapy, it is no longer an option unless it is obtained through the limited access program from the manufacturer.

The proton pump inhibitors are the drugs of choice for maintenance treatment of moderate to severe esophagitis. Lower doses of a proton pump inhibitor or alternate-day dosing may be effective in some patients with less-severe disease, thereby allowing titration in some cases. Preliminary data with *esomeprazole* suggest that "on demand" maintenance therapy for patients with endoscopy-negative GERD may be effective However, patients with more severe disease and/or complications should be maintained on *omeprazole 20 mg daily, lansoprazole 30 mg daily, rabeprazole 20 mg daily, or esomeprazole 20 mg daily.*

Proton pump inhibitors to gastroenterologists. Long-term chronic use of higher doses of proton pump inhibitors is not indicated unless the patient has complicated symptoms, has high-grade erosive esophagitis per endoscopy, or has had further diagnostic evaluation to determine the level of acid exposure. Many institutions allow the use of normal-dose proton pump inhibitors by all physicians, but limit the use of high dose.

Antireflux surgery and other endoluminal procedures may also be considered a viable alternative to long-term drug therapy for maintenance of healing in patients who are candidates. Maintenance Therapy with Proton Pump Inhibitors In a comparison of maintenance regimens, omeprazole (20 mg daily) alone or in combination with cisapride (10 mg three times daily) was significantly more effective in preventing recurrence of erosive GERD than was **ranitidine** (150 mg three times daily) alone or cisapride (10 mg three times daily) alone. **Omeprazole** was also effective in patients with complicated forms (grades 3 and 4) of esophagitis. **Omeprazole** and **lansoprazole** in doses of 20 mg and 30 mg daily, respectively, decreased relapse rates significantly. At 1 year, relapse rates were 15% and 10%, respectively.

Both *omeprazole* and *lansoprazole* were superior to *H2-receptor antagonists* in maintaining *Lansoprazole* 15 mg daily was compared to *lansoprazole* 30 mg daily or ranitidine 300 mg twice daily in preventing recurrence of reflux esophagitis. At 12 months, relapse rates were 31%, 20%, and 68% for lansoprazole 15 mg, 30 mg, and ranitidine 300 mg, respectively. Lansoprazole 15 mg and 30 mg daily were comparable in maintaining SPECIAL POPULATIONS CONSIDERATIONS ATYPICAL GERD SYMPTOMS Patients presenting with atypical symptoms may require higher doses and longer treatment courses as compared with patients with typical symptoms.

These patients are best diagnosed with ambulatory pH testing or an empiric trial with a proton pump inhibitor In patients presenting with noncardiac chest pain, a short course (1 to 8 weeks) of treatment phase for grade 1 or 2 esophagitis, patients were randomized to receive maintenance therapy with omeprazole 10 mg daily or ranitidine 150 mg twice daily. At 1 year, 68% of patients on omeprazole were in remission, as compared with 39% of patients receiving ranitidine. Even at a lower dose, omeprazole was superior to ranitidine

for maintenance therapy.

Preliminary placebo-controlled studies with esomeprazole indicate that maintenance of erosive esophagitis healing occurs in 54% to 94% of patients after 6 months of 10-mg to 40-mg doses of esomperazole. Doses of 20 mg to 40 mg were superior to the 10-mg dose. Studies are needed comparing esomeprazole to the other proton pump inhibitors in maintenance therapy for GERD. Omeprazole 20 mg (given on 35 the weekend) was compared to omeprazole 20 mg daily and ranitidine 150 mg twice daily.

The relapse rate at 12 months was 68%, 11%, and 75%, respectively, indicating that weekend regimens are ineffective in preventing recurrence.Long-term studies are needed with pantoprazole, but it should be effective as maintenance therapy for GERD.Long-term use of the proton pump inhibitors indicates that they are safe, with no evidence of carcinoid tumors directly linked to their use.Prolonged hypergastrinemia leading to the development of colonic polyps, and potentially adenocarcinoma, was also a concern that has proven unfounded with long-term use of proton pump inhibitors.However, the role of Helicobacter pylori status in patients with GERD is a concern. One study showed that patients treated with proton pump inhibitors had a higher incidence of atrophic gastritis that was linked to the development of gastric cancer.

In this study, 30% of patients treated with omeprazole over an average of 5 years developed atrophy, whereas none of a cohort group that received antireflux surgery developed atrophy within the same time frame.Most of the patients who developed atrophic gastritis had concomitant H.pylori infection. On the other hand, the presence of H. pylori infection may have a protective effect against GERD, and clearing the infection may be associated with a worsening of GERD symptoms.

The FDA recently stated that there was insufficient evidence linking proton pump inhibitor use to atrophic gastritis, intestinal metaplasia, or gastric cancer.76 As a consequence of the controversy surrounding H. pylori and GERD, specific guidelines on how to handle these patients are lacking. Most clinicians would probably opt to eradicate H. pylori infections once detected. Further studies are needed to determine the role of H. pylori in patients with GERD.

Maintenance Therapy with H2-Receptor Antagonists

The studies evaluating the efficacy of the H2-receptor antagonists in maintaining GERD patients in remission have been disappointing. Currently, ranitidine 150 mg twice daily is the only H2-receptor antagonist regimen that is FDA approved for maintenance of healing of erosive esophagitis.

Omeprazole 20 mg twice daily has been advocated. In patients with asthma, antireflux medications have been shown to improve asthma symptoms and even to decrease anti asthma medication use, but were found to have little or no effect on lung function.A trial of 3 months has been advocated using twice-daily proton pump inhibitor therapy for both asthma and laryngeal symptoms thought to be associated with GERD. Omeprazole doses as high as 60 mg daily have been used.In patients with chronic cough, pH testing is the preferred approach for evaluation of GERD, when available.

Maintenance therapy is **P1: FCH/FFX P2: FCH/FFX QC: FCH/FFX T1: FCH GB109-32 March 2, 2005**.
Generally indicated in patients who respond to the therapeutic trial or have endoscopic evidence of reflux. Interventional management may be indicated in selected patients not responding to medical management**.**

ENDOSCOPY-NEGATIVE REFLUX DISEASE

While the integrity of the esophageal mucosa is best evaluated with endoscopy, it does not confirm whether or not the patient's symptoms are related to GERD.In some cases, patients with typical symptoms and increased acid exposure have no evidence of esophageal damage.[27] Many patients with persistent severe symptoms but normal endoscopy will require therapy similar to those with positive endoscopic findings. This condition is referred to as endoscopy-negative reflux disease.

Patients presenting with normal esophageal mucosa on endoscopy may undergo pH testing or a therapeutic trial with a proton pump inhibitor to further confirm the diagnosis of GERD. Remember, however, that even when ambulatory pH monitoring or a therapeutic trial is used, it does not absolutely rule GERD in or out.

In more serious cases, both may be necessary to confirm the diagnosis.Patients with normal endoscopy treated with omeprazole had improvement in symptoms, quality-of-life scores, and antacid use.

Treatment with a proton pump inhibitor is more effective than treatment with an H2-receptor antagonist in these patients, as demonstrated by several clinical trials.

PEDIATRIC PATIENTS WITH GERD

Gastroesophageal reflux occurs in approximately 18% of the infant population.

Most have physiologic reflux with no clinical consequence. Complications, although rare, include distal esophagitis, failure to thrive, esophageal peptic strictures, BE, and pulmonary disease. Chronic vomiting associated with gastroesophageal reflux must be distinguished from other causes such as neurologic, metabolic, eating, and rumination disorders.

Developmental immaturity of the LES is one suspected cause of gastroesophageal reflux in infants. Like adults, transient LES relaxations seem to be the most common cause of gastroesophageal reflux in children.

Other causes include impaired luminal clearance of gastric acid, neurologic impairment, and type of infant formula. Uncomplicated gastroesophageal reflux usually resolves without incident by 12 to 18 months of life, and usually responds to supportive therapy, including dietary adjustments, postural management, and reassurance for the parents.

Thickened feedings may be useful in milder cases. Smaller, more frequent feedings may also be beneficial. If there is no improvement, medical therapy may be indicated.

Combined use of a prokinetic agent and an acid-suppressing agent seems to work the fastest.85 Unfortunately, there is no longer a readily available prokinetic agent without major problems. H2-receptor antagonists are commonly used. A dose of ranitidine 2 mg/kg twice daily is effective.The use of proton pump inhibitors is becoming more common in pediatrics.

Lansoprazole recently received FDA approval for treating symptomatic and erosive GERD in pediatric patients <1 year old. A dose of 15 mg once daily is recommended for children weighing ≤30 kg, and a dose of 30 mg once daily is recommended for those weighing >30 kg.While not FDA approved for use in children, there is evidence supporting the effectiveness of omeprazole in treating children with GERD.

A common dose for treating esophagitis is 1 mg/kg per day (divided once or twice daily). While no major adverse events have been noted in children receiving proton pump inhibitors for up to 7 years, the relative safety of prolonged proton pump inhibitor use in children remains unknown.There are no data involving the other proton pump inhibitors in the treatment of GERD.

ELDERLY PATIENTS WITH GERD

Many elderly patients have decreased host defense mechanisms such as saliva production.

More aggressive therapy with a proton pump inhibitor may be warranted in patients with symptomatic GERD in patients older than 60 years of age. Often these patients do not seek medical attention because they feel their symptoms are part of the normal aging process.They may present with a typical symptoms such as chest pain, asthma, hoarseness, coughing, wheezing, poor dentition, or jaw pain. Decreased GI motility is a common problem in elderly patients.Unfortunately, there are no good prokinetic agents available to these patients.

Cisapride is not available for general use and elderly patients are especially sensitive to the central nervous system effects of **metoclopramide**.They may also be sensitive to the central nervous system effects of H2-receptor antagonists.

Proton pump inhibitors appear to be the most useful treatment modality because they have superior efficacy and are dosed once daily, which is beneficial in all patients, but is especially beneficial in the elderly.

Herbal treatment to GERD

The present study is aimed at review on to find out natural remedies from medicinal plants which offer many potential efficacy to treat reflux disease (GERD), transient lower esophageal sphincter relaxations (TLESR) and reducing inflammation.[28]

Fumaria officinalis (Fumitory-of-the-wall) and ***Chelidonium majus*** (Celandine) are potent cholagogues that empirically seem to be helpful. ***Artemisia asiatica*** (Asian worm wood) has been shown to reduce GERD related symptoms. ***Atropa belladonna*** (belladonna, deadly nightshade) and other anticholinergics are also shown efficacy to treat **TLESR**.[TLESR stands for transient lower esophageal sphincter relaxation]

Demulcents, such as ***Ulmus rubra*** (Slippery Elm),***Alginic acid***, ***Ceratonia siliqua*** (Carob), ***Althaea officinalis*** (Marshmallow), and ***Aloe vera***

(Aloe) leaf gel showed to reduce acute symptoms and heal acid-damaged tissues.

Inflammation herbal modulators, such as ***Zingiber officinale*** (Ginger), ***Deglycyrrhizinated liquorice***, ***Calendula officinalis*** (Calendula), ***Curcuma longa*** (Turmeric), ***Rosmarinus officinalis*** (Rosemary) and ***Symphytum officinale*** (Comfrey) showed in tissue repair and symptom control. The present study indicated that these medicinal plants are very useful to treat the GERD naturally with better efficacy.

Look at the following pictures of the herbal drug sources used in the treatment of GERD.

German chamomile
Meadowsweet
Zingiber officinalis
liquorice

EVALUATION OF THERAPEUTIC OUTCOMES

The long-term benefits of treatment are difficult to assess because of the limited information known about the epidemiology and natural history of GERD. Therefore successful outcomes are generally measured in terms of three separate endpoints

relieving symptoms healing the injured mucosa preventing complications.

The short-term goal of therapy is to relieve symptoms such as heartburn and regurgitation to the point at which they do not impair the patient's quality of life. Patients should be educated regarding lifestyle modifications that should be adhered to throughout the course of therapy including smoking cessation, weight loss, raising the head of the bed, eating smaller meals, and avoiding eating prior to bedtime.

Patients should also be instructed to avoid foods that aggravate GERD symptoms, such as fat and chocolate. In addition, the patient's drug profile should be reviewed to identify medications that may contribute to GERD symptoms.These agents should be avoided if possible.has recommendations for providing pharmaceutical care to patients with GERD. The clinician should take an active role in educating the patient about potential adverse effects and drug interactions that may occur with drug therapy.The frequency and severity of symptoms should be monitored and patients should be counseled on symptoms that suggest the presence of complications requiring immediate medical attention, such as dysphagia or odynophagia. Patients with persistent symptoms should be evaluated for the presence of strictures or other complications. Patients should also be monitored for the presence of atypical symptoms such as cough, nonallergic asthma, or chest pain.These symptoms require further diagnostic evaluation. Long-term maintenance treatment is indicated in patients who have strictures because they commonly recur if esophagitis is not treated.

The second goal is to heal the injured mucosa. Again, lifestyle modifications and the importance of complying with the therapeutic regimen chosen to heal the mucosa should be stressed. Patients should be educated about the risk of relapse and the need for long-term maintenance therapy to prevent recurrence or complications. The final, more long-term goal of therapy is to decrease the risk of complications (esophagitis, strictures, and BE). A small subset of patients may continue to fail treatment despite therapy with high doses of H2-receptor antagonists or omeprazole. Maintenance therapy with standard to higher doses of antisecretory agents may be indicated in these acid hyper secreters, because severe esophagitis that is not recommended for Providing Pharmaceutical Care to Patients with GERD.[29] Assess the patient's symptoms to determine if patient-directed therapy is appropriate or whether they should be evaluated by a physician. Determine the type of symptoms, frequency, and exacerbating factors. Refer any patient with complicated or atypical symptoms to a physician for further diagnostic work-up. Obtain a thorough history of prescription, nonprescription, and natural drug product use.

Counsel the patient on lifestyle modifications that will improve symptoms. These include the following measures.

avoiding foods and medications that worsenGERD, avoiding tight-fitting clothes, eating smaller meals, raising the head of the bed, losing weight, and avoiding tobacco use.

Recommend appropriate drug therapy based on patient presentation. Proton pump inhibitors are the drugs of choice for patients with moderate to severe symptoms.

Develop a plan to assess effectiveness of acid-suppressing therapy after an appropriate amount of time (8–16 weeks).

Recommend alternative therapy if necessary. Assess improvement in quality-of-life measures such as physical, psychological, and social functioning and well-being.

Evaluate the patient for the presence of adverse drug reactions, drug allergies, and drug interactions.

Recommend a therapeutic regimen that is easy for the patient to accomplish. Provide patient education with regard to disease state, lifestyle modifications, and drug therapy.

Patients should be counseled on What causes GERD and what things to avoid When to take their medications What potential adverse effects may occur Which drugs may interact with their therapy What warning signs they should report to their physician (dysphagia, odynophagia, unexplained weight loss, or bleeding) adequately treated may lead to BE and its associated risk of adenocarcinoma.

Unfortunately, data are lacking that show that effective treatment of esophagitis decreases the risk of developing adenocarcinoma in patients with BE.

Patients should be monitored for the presence of continual pain, dysphagia, or odynophagia.

CONCLUSIONS:

Gastroesophageal reflux disease is a common entity that classically presents as heartburn. The pathophysiology of reflux is complex, involving both aggressive factors (acid, pepsin, bile acids, pancreatic enzymes, and prostaglandins) and defense mechanisms (anatomic factors, LES pressure, esophageal clearance, and gastric emptying). Therapeutic modalities are designed to minimize the aggressive factors and/or augment defense mechanisms. The pharmacologic critical elements outlined should be considered. A serious issue with the digestive system is GERD. With careful consideration of the usual and unusual symptoms, anamnesis is essential for diagnosing GERD (period, intensity, recurrence, aggravating and relieving points, evolution, and effect on the well-being of life). The most accurate diagnostic techniques are high-resolution endoscopy and esophageal peroral endoscopic myotomy (POEM). The therapeutic therapy effectively manages the known symptoms, but the main challenge is maintaining the affected individuals' asymptomatic status over time. Patients who require ongoing medication, are drug-intolerant, or have complex forms of GERD might consider surgery. People with this problem should modify their lifestyle and take medications if required. In the aspect of research, several institutes conducted various clinical trials on many digestive diseases and GERD is one of them.when evaluating and treating a patient with GERD.

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