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# Putting Chronic Heartburn On Ice

Over the years, gastroesophageal reflux disease has proven to be one of the most common complaints facing family physicians. With quicker diagnosis, this pesky ailment can be stopped in its tracks.

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**H**earthburn is defined as a substernal pain or burning sensation usually associated with the reflux of acidic gastric juices into the esophagus. Heartburn, along with other complaints of gastroesophageal reflux disease (GERD), is a common complaint in our population, affecting up to one in five people. As well as causing symptoms, GERD can potentially cause fairly significant consequences, including strictures and esophageal cancer.

## Pathophysiology

In general, the development of GERD involves:

1. Dysfunction of the anti-reflux barrier, which usually prevents excessive gastric juices from refluxing; and
2. A number of motility disorders that increase the time of exposure of the esophageal mucosa to the refluxed gastric contents.

### *Lower Esophageal Sphincter (LES)*

The anti-reflux mechanism is a combination of an LES and the diaphragm. The LES is a specialized, smooth muscle, preventing reflux by acting like a valve in the lower esophagus. It relaxes to stimuli, much like swallowing. It is widely believed that a weakened LES is responsible for reflux, but

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more acid reflux. A weakened LES, reflux following swallowing with LES relaxation and increased abdominal pressure play lesser roles in GERD.

## *The Diaphragm*

The diaphragm has an opening to allow the esophagus to pass through from chest to abdomen. Thus, it encircles the distal esophagus and, with its movement during inspiration, creates a pinching mechanism to prevent reflux.

When the LES is measured in the motility labs, the reported valve is an additive valve of the LES muscle plus the pressure created by the diaphragm.

In patients with a hiatus hernia, where the LES muscle is in the chest above the diaphragm, it is understandable that the total distal esophageal pressure is disrupted.

Patients with increased abdominal pressure from pregnancy and obesity, or in the shorter term, from coughing and straining, are therefore more prone to GERD.

Complicating reflux further, patients with hiatus hernia have more frequent TLESRs, likely from distention of the fundus induced by gas.

that concept is now in doubt. More likely, transient LES relaxations (TLESRs) are the major mechanism for reflux.

TLESR describes relaxation of the LES not preceded by swallowing, and lasting 10 to 45 seconds.<sup>1</sup> TLESRs occur every day in normal people resulting in reflux. In patients with severe GERD, TLESRs occur more frequently and are associated with



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## Motility Disorders

### *Gastric Emptying*

Gastric emptying is frequently delayed in patients with GERD.<sup>2</sup> Gastric contents, as a result, remain in the stomach and may contribute to gastric distention. This triggers an increase in TLESRs and more reflux, with gastric contents in position for easy regurgitation.

### *Esophageal Clearance*

Gravity, saliva and peristalsis all act to lessen the time refluxed acid is exposed to the esophageal mucosa. Patients with reflux esophagitis often have abnormalities in peristalsis. Sleep time may be particularly troublesome as the patients are supine. Gravity influences, saliva and swallowing are all decreased during sleep. This inspires reduced peristalsis. If a hiatus hernia is present, it may hold up fluids in the hernia, making them ready for easy return into the esophagus.

## Acid and GERD

Altered mechanisms, such as increased TLESRs, lead to increased exposure of the esophagus to acid and pepsin where they penetrate the epithelium. This causes microscopic damage and, at times, endoscopically visible damage to the mucosa. Symptoms like heartburn result.

Saliva is a natural antacid, as it contains bicarbonate. With prolonged acid reflux, however, saliva's buffering capacity and cellular barriers to acid are soon inadequate. Acid damages mucosa, causing inflammation and erosive esophagitis. Acid can contact nerve endings and result in heartburn.

The more prolonged the acid exposure,

the more frequent the acid reflux symptoms. The portion of time the esophageal hydrogen ion concentration (pH) is below four predicts the frequency of symptoms.

## Diagnosis

The diagnosis of GERD is based on symptoms of uncomplicated heartburn. For patients with complicated or long-standing problems, however, investigations may be necessary. These include upper gastrointestinal endoscopy, 24-hour pH monitoring, radiologic studies, esophageal manometry and proton pump inhibitor (PPI) tests.

The most common symptom of GERD is heartburn. Approximately one-third of patients will present with heartburn—a burning sensation generally lasting for 10 minutes to several hours, typically one to two hours after a meal. Heartburn is classically worsened with lying flat, bending over, post-heavy meals, spicy foods, high-fat meals and alcohol. Other symptoms include regurgitation of acid, acidic taste in one's mouth, epigastric pain, dysphagia, dyspepsia, bloating and belching.

More recently, extra-esophageal symptoms and diseases have been more widely recognized to be associated with GERD. These include: pulmonary diseases, such as asthma, chronic cough, pulmonary fibrosis, pneumonia and chronic bronchitis; otolaryngologic diseases, such as pharyngitis, otitis, sinusitis, subglottic stenosis, hoarseness and even laryngeal cancer; and others, such as chest pain, sleep apnea and dental

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erosions. The pathophysiology is not well understood, but may involve a dysfunctional upper esophageal sphincter (UES) along with LES and microaspiration. GERD must be considered in the differential diagnosis in patients who present with these symptoms and diseases.

## Testing

Endoscopy is generally reserved for those patients in whom it is necessary to: 1) confirm the diagnosis when a trial of therapy is unsuccessful, or to assess the cause of alarm symptoms, such as bleeding, vomiting, dysphagia and weight loss; and 2) to screen for Barrett's esophagus in a patient with long-standing reflux. It must be remembered that

endoscopy tends to only have a sensitivity of 30% to 40% in finding pathologic changes in patients with GERD. GERD may be the cause of symptoms even with a normal endoscopic examination. In regard to diagnosing esophagitis, although there is not a universally adopted measurement system for severity, the Los Angeles Classification is gaining acceptance.

Though pH monitoring was once considered the gold standard for the diagnosis of GERD, it suffers from several limitations. During pH monitoring, one or multiple probes are placed within the esophagus, with at least one located 3 cm to 5 cm proximally to the LES. Patients are asked to continue their daily activities for 24 hours. The percentage of time the pH is less than four has shown to be a predictor of GERD. Unfortunately, one-quarter of patients with esophagitis will have normal pH studies. Of further note, the reproducibility between tests is only 85%. Since symptoms of GERD fluctuate with time, a one-time test may be fairly inaccurate.

To improve predictability, pH monitoring is measured with a symptom index, whereby patients indicate when they have symptoms throughout the day. It is defined as the number of symptom episodes divided by the number of episodes of pH less than four. This gives a better correlation between symptoms and acid exposure, and, as a result, provides a better diagnostic tool for evaluation of GERD. It will not, however, differentiate

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between a patient who has four episodes of reflux a day *versus* 20 if the symptom index is equivalent (although the patient with the greater number of episodes probably has more significant disease). Currently, pH monitoring tends to be reserved for patients with inconsistent or unusual symptoms, especially extra-esophageal symptoms and diseases, as well as normal endoscopies.<sup>3</sup>

Radiologic studies include barium esophagograms and scintigraphic studies. Barium esophagograms are useful in diagnosing hiatus hernia, esophageal strictures and rings in patients with dysphagia. Although it can detect severe esophagitis, it has a poor sensitivity for diagnosing GERD when compared to pH monitoring.

Scintigraphy includes a gastric bolus of labelled technetium. It has up to 90% sensitivity for reflux, but only 50% sensitivity for predicting esophagitis. It is particularly useful in evaluating patients in the post-gastric surgery or post-therapy session, since buffered reflux will still be identified.<sup>3</sup>

Esophageal manometry has limited utility in the diagnosis of GERD. It may be useful, however, in predicting severe GERD in patients with decreased LES function and/or esophageal dysmotility. Manometry is required prior to considering fundoplication surgery, since esophageal dysmotility will lead to a poor surgical outcome.

Recently, a trial with a PPI has gained popularity. It is reserved for those patients with straightforward symptoms of GERD, with no alarm symptoms. The sensitivity is approximately 80% for the diagnosis of GERD. Only a few studies have been performed, however, and the length of trial treatment is unknown. There is a concern that acid suppression may mask symptoms relat-



ed to malignancy or ulcer disease, and Barrett's esophagus may be missed.

## Treatment

### Lifestyle

Treatment for GERD is directed towards relieving symptoms, treating esophagitis, preventing recurrence and preventing long-term sequelae.

Primary therapy should be directed at lifestyle modification, including elevating the patient's head of the bed using blocks, reducing alcohol intake, smoking cessation, weight loss and avoiding eating within two hours of bedtime. If symptoms persist, then medical or surgical therapy may be necessary. Fatty foods and

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## **Medical Therapy**

Medical treatment for GERD has changed significantly in a relatively short period of time. The principles of medical management include protecting the lining of the stomach and esophagus from acid damage, and reducing

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the acid production of the stomach. Antacids and algenic acid, which coat the lining of the stomach and esophagus, may be useful for mild, intermittent heartburn. More severe, long-standing heartburn is more effectively treated with acid suppression *via* histamine receptor blockers (H<sub>2</sub>

blockers) and PPIs. In general, PPIs are more effective in controlling gastric acid production as compared to H<sub>2</sub> blockers.

Patients may only need occasional medications for control of their symptoms, but there are a large percentage of patients with heartburn for which long-term medical management is a necessity. These include patients with complications of GERD, such as esophagitis, esophageal stricture and Barrett's esophagus. The PPIs available, including omeprazole, lansoprazole, rabeprazole (not available in Canada) and pantoprazole, are all very effective for treating GERD. Esomeprazole—the S isomer of omeprazole—will soon be available for prescribing in Canada. It is in use in the United States and United Kingdom, and appears to have higher healing rates of reflux esophagitis when compared to omeprazole.<sup>4</sup>

Patients with severe GERD will almost certainly need maintenance therapy with PPIs.<sup>5</sup> Long-term PPI use is safe. Of major importance is the fact there are no reports of cancer as a result of over 10 years of experience with these drugs. Long-term use of PPIs and H<sub>2</sub> blockers has shown to be safe with few side effects.

## **Surgical Therapy for GERD**

Surgical therapy for GERD is directed at improving the LES pressure and returning the gastro-esophageal junction to its anatomical location. It is indicated most commonly for patients in whom long-term medical therapy is a necessity. Surgery is a safe alternative to medication. Surgery also is indicated for patients whose symptoms, such as regurgitation, persist despite maximal medical therapy.

During surgery, the fundus of the stomach is wrapped around the esophagus. This may include a crural repair in patients with a hiatus hernia. The procedure is commonly performed laparoscopically. The open procedure is associated with a longer length of hospital stay, increased levels of post-operative pain and occasional wound complications. On occasion, it may be necessary for a laparoscopic procedure to become an open one. The results of surgical fundoplication are very good. Approximately 95% of patients report relief of symptoms, and 94% have normal post-operative 24-hour pH monitoring results.<sup>6</sup> Dysphagia may be an initial post-operative complication in up to 17% of patients, however, repeat dilation may be performed with positive results, reducing dysphagia to 4%.<sup>7</sup>

In the early stages, there are two endoscopic anti-reflux procedures:

1. The endoscopic sewing machine to sew the gastroesophageal junction tighter from within.
2. The Stretta radiofrequency technique to build up tissue and a resulting barrier at the gastroesophageal junction.

## Barrett's Esophagus

When intestinal metaplasia of the mucosa of the distal esophagus occurs it is called Barrett's esophagus. It can be identified endoscopically, but confirmation is made histologically. Barrett's mucosal transformation is a result of chronic acid exposure to the distal esophagus. It may or may not be associated with esophagitis on first diagnosis. Barrett's mucosa has a 1% per

year risk of developing dysplasia within the Barrett's mucosa, which can lead to esophageal adenocarcinoma.

Once identified, surveillance of Barrett's for dysplasia should be performed on a yearly basis with four quadrant biopsies at levels separated by 2 cm. Either medical or surgical therapy should continue throughout this time. While therapy may decrease the probability of developing dysplasia, it does not eradicate the abnormal mucosa. Recent trials have been performed to evaluate ablation therapy of Barrett's mucosa with argon plasma coagulation or electrocautery. While ablation has been successful in restoring squamous mucosa, concerns exist regarding complications and persistent islands of abnormal intestinal mucosa deep to the squamous mucosa. Time will tell. **Dx**

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### References

1. Mittal RK, Holloway RH, Penagini R, et al: Transient lower esophageal sphincter relaxation. *Gastroenterology* 1995; 109:601-10.
2. McCallum RW: Gastric emptying in gastroesophageal reflux and the therapeutic role of prokinetic agents. *Gastroenterol Clin North Am* 1990; 19:551-64.
3. Younes Z, Johnson DA: Diagnostic evaluation in gastroesophageal reflux disease. *Gastroenterology Clinics* 1999; 28(4):809-30.
4. Kahrilas PJ, Falk GW, Johnson DA, et al: Esomeprazole improves healing and symptom resolution as compared with omeprazole in reflux oesophagitis patients: a randomized controlled trial. The Esomeprazole Study Investigators. *Aliment Pharmacol Ther* 2000; 14: 1249-58.
5. Dent J, Yeomans ND, Mackinnon M, et al: Omeprazole v ranitidine for prevention of relapse in reflux oesophagitis. A controlled double blind trial of their efficacy and safety. *Gut* 1994; 35(5):590-8.
6. Hunter JG, Trus TL, Branum GD, et al: A physiologic approach to laparoscopic fundoplication for gastroesophageal reflux disease. *Ann Surg* 1996; 223:673-87.
7. Trus TL, Laycock WS, Branum G, et al: Intermediate follow-up of laparoscopic antireflux surgery. *Am J Surg* 1996; 171:32-5.