Anti-reflux Surgery for GastroEsophageal Reflux Disease (GERD)

What is GERD?

Gastro esophageal reflux disease or GERD means regurgitation of acid stomach contents into the esophagus. In normal health there are mechanisms that prevent reflux. The resistance of the lining of the esophagus prevents damage and injury. Breakdown of these mechanisms leads to prolonged and abnormal contact of acid with esophageal mucosa and chronic injury. This causes symptoms and can be seen with endoscopic examination of the esophagus. Besides the symptoms themselves being a problem, longstanding exposure of the esophageal mucosa to acid may lead to changes called Barrett's epithelium, and eventually to cancer. Recognition of GERD, and appropriate management and continued surveillance is important, to relieve symptoms and prevent complications and possibly the future development of cancer.

Why does GERD happen?

Normally the junction of the esophagus with the stomach (GEJ) provides a barrier to prolonged acid reflux. The acute angulation, the muscular crurae of the esophageal hiatus, the length of esophagus inside the abdomen, mucosal folds inside the GEJ and the Phreno-esophageal ligaments provide anatomical barriers. The individual contribution of each is not clear, but the length of the lower esophagus that lies within the abdomen as opposed to the chest seems to be important. With Hiatal hernias the GEJ moves into the chest and seems to lose its competence more easily than if it were in the abdomen. However all hiatal hernias are not associated with symptomatic GERD.

Gravity (upright posture), esophageal motility, mucosal resistance all play a role in GERD. Clearly individual differences in the above decide why Reflux becomes a disease in certain individuals and not in others.

All of the above factors preventing reflux usually correlate with a zone in the lower esophagus-

called the lower esophageal sphincter (LES). Generally this zone has higher-pressure than the rest of the esophagus and this helps prevent reflux. Patients with demonstrable lowering of the tone in this zone tend to benefit from surgery if medication fails to control disease. Those with normal LES pressures tend to have either lowered mucosal resistance issues or esophageal motility problems and anti-reflux procedures may not cure their problems and at times may make it worse. Careful preoperative evaluation is therefore mandatory.

What does a patient with GERD experience?

Patients with GERD may experience Typical symptoms related to the damaging effects on the lower esophagus called Reflux esophagitis. These include heartburn, water brash, bitter or acidic taste in the mouth and regurgitation of partially digested food. Chest pain similar to that in heart disease is seen also.

Atypical symptoms are those felt remote from the lower esophagus. At least 20-25% of patients will have some atypical symptoms. Persistent sore throat, nighttime asthmatic symptoms, chronic earache, recurrent sinusitis, halitosis (foul breath), feeling of sticking in throat (globus pharyngeus), and frank aspiration pneumonia are some of the more common symptoms. In the absence of local disease in the ears, nose or throat, these findings will prompt a search for GERD.

Some patients may have undiagnosed GERD for prolonged period and may have symptoms from complications of GERD. Progressive difficulty in swallowing, initially solids and later liquids may be due to narrowing in the esophagus (stricture), from inflammation or cancer.

Workup of patients with GERD:

For patients newly diagnosed with typical symptoms of GERD on the basis of History and Physical examination, extensive workup is not necessary. Life style modifications and antacid therapy initially is appropriate, and often all that is needed. Most Primary Care Physicians will ask for an Upper Endoscopy to be performed at some point. This has a dual purpose-to rule out the possibility of cancer, and to evaluate the degree of injury, because the symptoms correlate poorly with the degree of actual injury to the esophagus.

If symptoms are not typical, persist after maximal treatment, or relapse after appropriate measures or there is doubt regarding the cause, or the patient seeks surgical relief, further workup is indicated. The aims of this workup are as follows:

1. Establishment of GERD and Reflux esophagitis as the cause of symptoms. 24-hour pH monitoring is the most frequently performed test. This test continuously measures the actual acidity in the lower esophagus over a period of 24 hours, and is the strongest proof of acid reflux and GERD. In an ambulatory setting a thin probe is placed in the lower esophagus and the pH measured and correlations made with patient events. The actual acidity, number of reflux events, contact times with the esophageal lining all are measured.

2. Manometric studies are performed to evaluate the motility of the esophagus. This test is simply a measurement of the pressures within the esophagus at different levels, while the patient is at rest and also when asked to swallow. This also allows the measurement of the function and the pressure of the Lower esophageal sphincter. These measurements are in the form of a tracing, which is then compared with normal studies. This is important if narrowing is suspected, and deciding which operation is suitable for the patient.

3. Endoscopy of the esophagus and stomach to visualize the lining, and eliminate other disease processes, take biopsies if Barrett's changes are seen. Hiatal hernia can be assessed, and also if the lower esophagus is shortened from inflammation. This will influence the nature of surgery to be carried out.

4. ENT examination of the larynx (voice box), throat, sinuses etc may be indicated when atypical symptoms are predominant.

5. Radiological studies such as Barium swallow may also be performed. Hiatal hernias, strictures and other conditions can be seen. It also may serve as a 'road map' when surgery is planned, especially if the esophagus is shortened.

Medical Management of GERD:

A. Medical Management:

This is always the initial treatment of GERD and the aims of this are to eliminate the symptoms and prevent long-term mucosal injury and the development of complications.

Life style changes include weight loss if applicable, avoiding sleeping flat and elimination of certain foods known to increase reflux (alcohol, chocolate etc.). These are combined initially with non-prescription antacids or H2 Blockers (such as Zantac). This is suitable for patients with symptoms without endoscopic evidence of mucosal injury, and primarily aims at relief of symptoms.

Proton pump inhibitors (such as Protonix) are used in patients who do not get relief of symptoms with the above and/or if there is evidence of esophageal injury from inflammation on endoscopy. The goal here is to heal the esophageal lining, and scheduled repeat endoscopy is carried out after 2-3 months of maximal medical therapy. Sometimes a drug to increase the tone of the Lower esophageal sphincter and improve the contractility of the stomach (such as Reglan) may be added.

The vast majority of patients will be cured if they are compliant with the life style changes and diet modifications and medication.

B. Surgical Management:

Anti-reflux surgery will need to be considered for GERD under the following conditions:

1. Intractable symptoms or persistence of injury to the esophageal lining on maximal medical therapy.

2. Complications of GERD such as Stricture (narrowing from inflammation and scarring) or Barrett's esophagus (abnormal changes in the lining from persisting inflammation-which may progress to cancer of the esophagus later on). The diagnosis is made on endoscopy at which time biopsies are also taken. If the biopsy suggests low-grade dysplasia (early or lower risk changes), and these do not change with maximal medical therapy, antireflux surgery is indicated.

3. Hiatal hernia (abnormal position of the upper stomach and lower esophagus into the chest through the opening in the diaphragm) in association with GERD symptoms and /or esophageal injury.

Surgery for GERD and surgery for hiatal hernia for practical purposes is one and the same thing. Repair of the weakness in the muscle that caused the Hernia, is one part of the operation. Wrapping part of the stomach around the lower esophagus, (either completely or partially), which corrects the acid reflux disease is the other part. There are many different ways to achieve this, but the operation called Nissen Fundoplication has the most reliable results over time in experienced hands. This operation was originally described as an open operation either through the chest or the abdomen. Nowadays

This surgery can be performed laparoscopically through the abdomen (4-5 small incisions in the upper abdomen) in 95% of patients. 5% of patients will require conversion to an open operation as a result of abnormal anatomy, previous surgery with scarring, or for complications from a short esophagus, or other complications during surgery such as bleeding or injury to other organs. Sometimes open operation may be required if the surgeon is not satisfied with the adequacy of the repair, for better visualization and repair under direct vision.

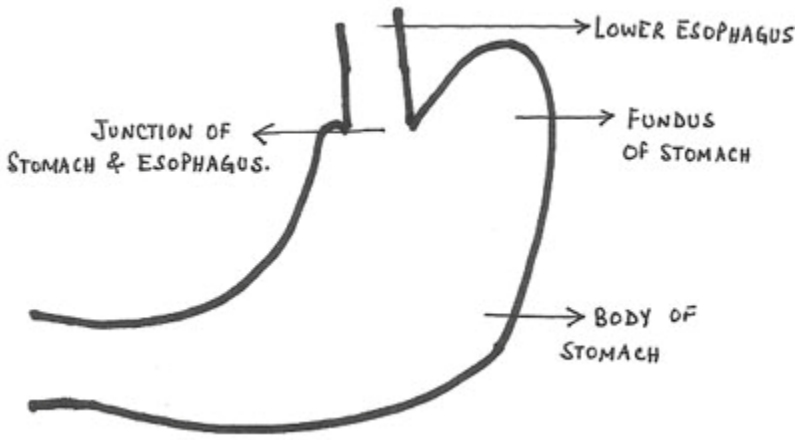
Sometimes the surgery is performed via an incision in the chest (Thoracotomy) if there is severe scarring in the abdomen from previous surgery for other conditions or GERD. Even under these conditions Laparoscopic approach is used initially, and is often successful.

Technique of Laparoscopic Nissen Fundoplication

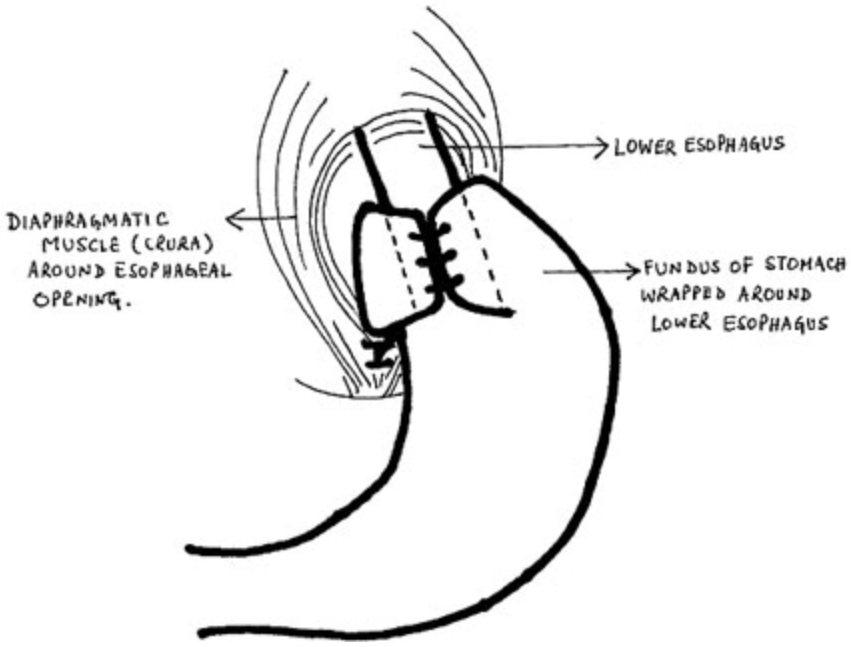
This surgery is performed under a general anesthetic. Usually 5 small incisions are made in the upper abdomen, two of these are about 1cm and the remaining three are ½ cm each. The first one is made under direct vision and the abdomen is then distended with carbon dioxide gas to help see the insides. A telescope and camera are passed through the first hole and everything thoroughly inspected. If it seems that the operation can be performed safely with the laparoscope, further holes (ports) are made under direct vision. Various special instruments are then passed through these ports to perform the surgery. The left side of the liver is retracted away from the front of the stomach and layers of tissue between the stomach and the liver (the gastro hepatic omentum) is divided under direct vision using the

ultrasonic knife (harmonic scalpel). The opening in the diaphragm through which the esophagus enters the abdomen is cleared out and any hiatal hernia is corrected. The crucial step now is deciding whether there is any shortening of the lower esophagus due to inflammation. Lengthening of the esophagus is carried out if the surgeon thinks that there is not enough length for repair without tension. This may require conversion to an open operation.

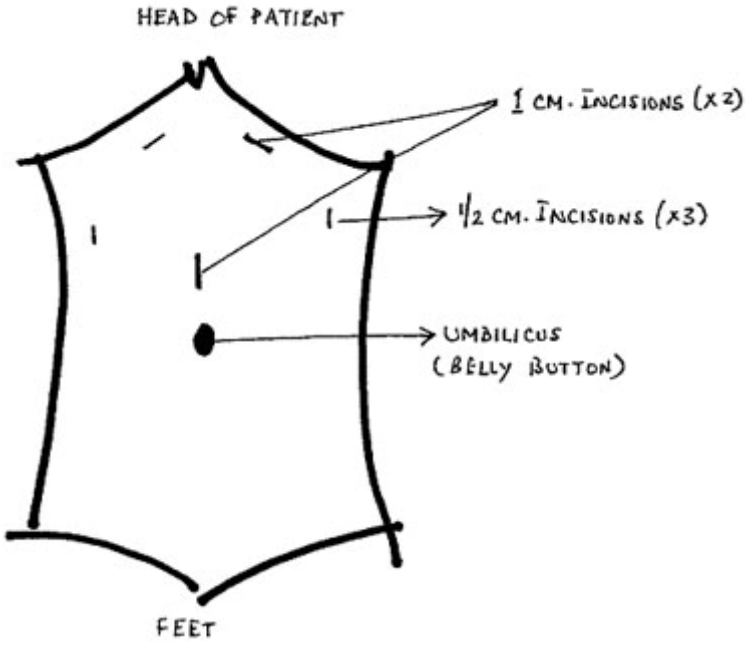
Once the esophagus and upper stomach have been cleaned out and separated, the opening in the diaphragm is evaluated, and made tighter if necessary at a later stage. The fundus of the stomach is then freed of small blood vessels using the ultrasonic knife. It is then made to pass around the back of the esophagus circumferentially and should be able to meet itself without undue tension around the front of the esophagus. This step is carried out with a guide (called dilator or bougie) in the esophagus so that undue tight wrapping is not done leading to narrowing of the esophagus. The diaphragmatic opening is now tightened with stitches to fit snugly around the lower esophagus. The wrap is then completed using stitches through the front and back lips of the fundus and with bites through the esophageal muscle. On completion of the operation the appearance is like that shown in the illustration. The larger 2 incisions are closed in 2 layers of stitches, and the smaller ones in one layer. All stitches are self-absorbing so there is nothing to remove later on.



Parts of the stomach



Appearance of the Nissen Fundoplication after the wrap



Placement of Incisions in Laparoscopic Nissen Fundoplication

Patient expectations

On an average the operation takes 1.5-2.0 hrs for completion. Most patients will be without respiratory support, breathing on their own. Post operative pain is usually controlled well with small doses of intravenous narcotics, such as Morphine. Most patients are ambulating by the following morning, and taking liquids to start with. If tolerated, a pureed diet is offered and if tolerated the patient may be discharged that evening if there are no other issues. Older patients and those with other significant problems may require an extra 24 hours in the hospital. Dietary restrictions are explained to the patient for the next 2 weeks, and follow up is planned after that time.

If the patient has been relieved of his or her symptoms and has no further complaints, no further surgical follow up is planned.

Complications

Laparoscopic Nissen fundoplication is a safe operation in experienced hands. Having to convert it to an open operation is not regarded as a complication when it is felt necessary in order to avoid any compromise either to the adequateness of the surgery or patient safety. This is true especially when the esophagus needs to be made longer for a satisfactory wrap, or when the anatomy is abnormal or difficult to identify. Occasionally bleeding may be difficult to control laparoscopically, and in the best interest of patient safety, open operation is carried out. Injury to the other organs in the abdomen may happen at the time of placement of ports or instruments and may require open surgery. Severe scarring in the abdomen from previous surgery in that area may not allow adequate laparoscopic access and visualization and open operation may be needed.

Postoperatively, due to sudden rise in intra-abdominal pressure as in gagging and retching, the wrap may either herniate into the chest or be disrupted. The repair stitches to the diaphragm may be torn also. Most often a patient who has been doing well gags or retches with food and then complains of chest pain, difficulty in swallowing and feels unwell overall. This condition may require urgent re-operation. Retching has to be avoided at all costs, and potent medications such as Zofran may be used to prevent this. Infection of port sites is very uncommon and usually not a serious problem. As with every operation there are the risks of general anesthesia. Patients with pre-existing medical co-morbid conditions are obviously riskier, but can be operated upon safely. Most patients will report a slight change in their eating and swallowing functions. This is generally normal, but if difficulty in swallowing persists, evaluation is carried out. Sometimes the wrapping of the stomach may be a little tight and patients may have bloating and the feeling of inability to eructate (belch or burp) with distension of the stomach. This can be related to creation of an over efficient valve at the Gastro esophageal junction-if persistent may require re-operation and do partial fundoplication. Rarely there may be a perforation (hole) in the stomach or esophagus, not recognized initially showing signs and symptoms of peritonitis later, this may need re-operation which may be done laparoscopically also.

Overall, Laparoscopic Nissen fundoplication is a safe, time-tested operation with excellent relief of symptoms in well selected patients. It certainly seems to protect against further injury to the lining of the esophagus, and there is some evidence currently that early changes of Barrett's esophagus may be even reversed with anti-reflux operations.
Most patients are delighted to have relief of long-standing symptoms and often the ability is needed especially for patients with Barrett's changes.