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## Reflux and Swallowing Disorders

Oesophagitis  
Hiatus Hernia  
Barrett's oesophagus  
Achalasia  
Laparoscopic fundoplication  
Laparoscopic Hiatus hernia repair  
Stretta therapy  
Endoscopic R.A.P  
Linx Antireflux  
Heller Myotomy  
Per Oral Endoscopic Myotomy

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## About the author

Associate Professor Michael Talbot started working as a consultant upper gastrointestinal surgeon in 2003, having completed 10 years of training following his internship in 1992–93. He started performing gastric band and gastric bypass surgery in 2003, and in 2004 was one of the first in Australia to perform sleeve gastrectomy and laparoscopic gastric bypass. Since then he has developed a large practice in bariatric and complex upper gastrointestinal surgery.

The surgical practice he works in is one of few in Australia regularly performing gastric band, bypass, sleeve gastrectomy, endoscopic sleeve gastroplasty and revision/corrective surgery for all procedures.

The practice also offers expertise in gallbladder and hernia surgery, repair of complex abdominal wall defects, endoscopic management of gallstones (ERCP), endoscopic oesophageal and gastric tumour therapy and state-of-the-art Barrett's oesophagus treatments. We have a specialised laboratory for the investigation of complex swallowing disorders and reflux, and are involved extensively in research.

We work with other doctors and health professionals as part of an interdisciplinary team to create a work environment focused on patient care, innovation and excellence. It is clear that patients do best when they have a range of people helping to look after them. This booklet is a document that will change over time as we learn more from our patients and from each other.



Dr Georgia Rigas



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### Essential information about this booklet

This booklet is intended to explain the diagnosis of reflux and swallowing disorders. It is not supposed to replace advice given by your doctor or other healthcare professionals, but rather to add to it.

If you have any questions or worries that you wish to discuss with your doctor, please write them down in the space provided. It is important that you understand as much as possible before and after the operation, to aid your weight loss and ensure a healthy lifestyle.

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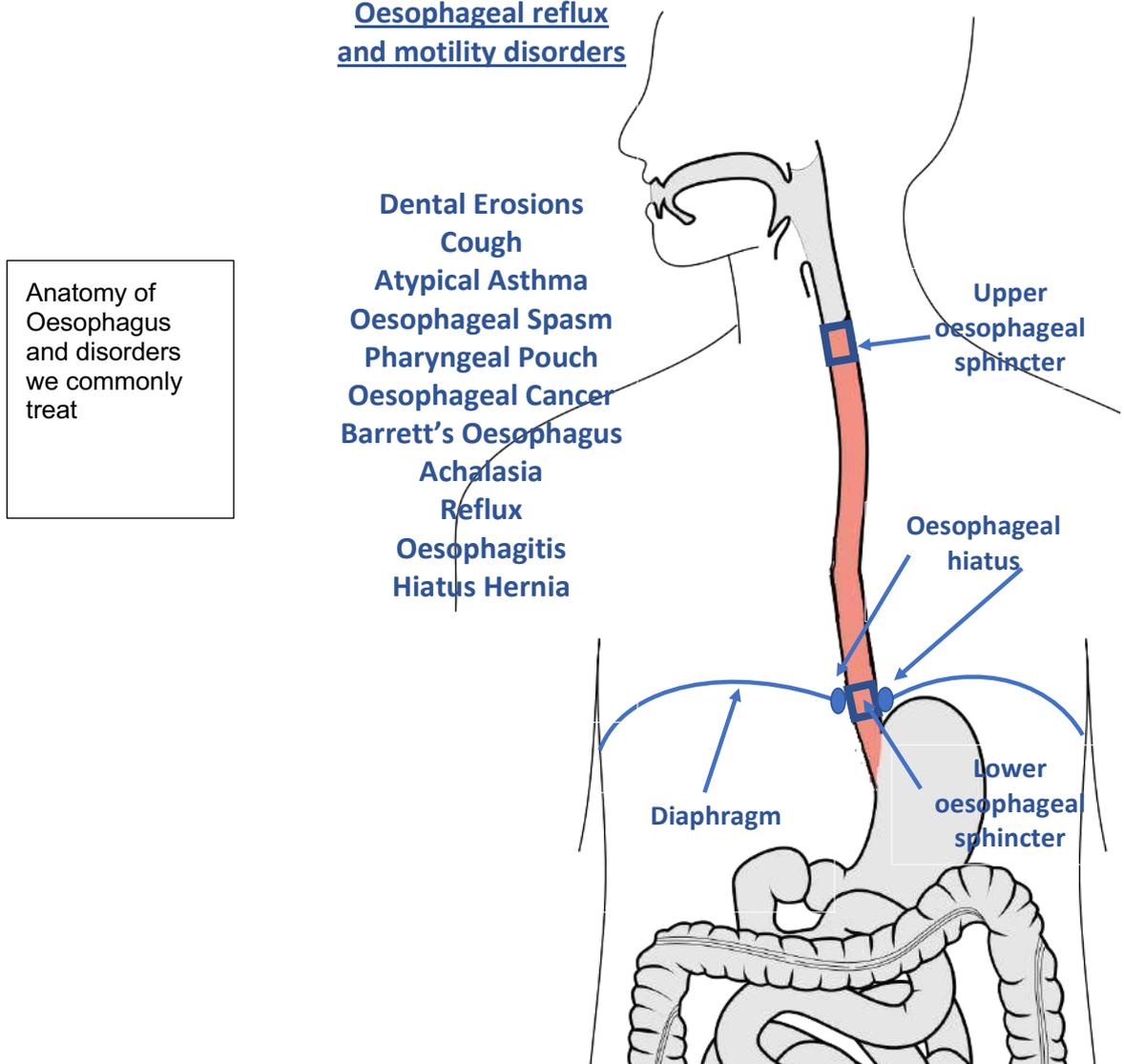
## The Oesophagus.

The oesophagus is like any part of our body, we don't really think about it until it starts to fail in its function. It is a thin muscular tube that is about 20 cm long, running from the back of the mouth, through the neck and chest (behind the heart and lungs), into the abdomen where it joins to the stomach.

The oesophagus functions like a rapid conveyor-belt, propelling food into the stomach which pulverises and liquifies it before its long journey through the small then long intestine for digestion and waste management. The stomach is one of the most toxic environments you can imagine, full of powerful acid and other chemicals that perform a useful function when they are contained in their rightful place, but cause trouble if they escape up the oesophagus. The oesophagus is lined by a delicate layer of skin that is almost identical to the skin of your wrist. It isn't hard to understand why it is so unpleasant for people when these chemicals escape and injure the oesophageal lining. As the oesophagus is very narrow, trapped between the spine behind it and the heart and lungs in front we can also see how easy it would be for anything we swallow to get stuck in the narrow space allowing a traffic jam to occur when we try to swallow more.

There are three types of disorders that lead to oesophageal symptoms, one caused by stomach contents escaping to injure the oesophagus, throat and lungs (Reflux), one caused by the oesophagus failing to propel what we swallow to move properly (Dysphagia – difficulty swallowing), and another when the oesophageal muscle spasms and causes cramp-like chest pain (Chest pain). It is possible for patients to have 1, 2 or 3 types of symptoms and this can make it hard to determine what underlying disorder is causing symptoms when they seek treatment.

### Oesophageal reflux and motility disorders



## **Symptoms.**

### **Reflux.**

The term “Reflux” is used to describe a group of symptoms caused when **acid or other gastric content leaves the stomach and moves up the oesophagus** and it is not an actual symptom itself. When someone says they have “reflux” we ask them specific details about their symptoms to get a better idea of what they are experiencing, as many patients labelled as having reflux disease have other conditions. The symptoms that people with reflux experience can include:

- 1) Heartburn.** This word is used to describe pain felt behind the lower breastbone that feels as if it has a “chemical” or “burning” component. Patients with this symptom often find that they can take medication or food/drink that will neutralise the discomfort they are feeling, and also that acidic foods as well as chocolate, alcohol, spicy food and large meals can trigger their symptoms.
- 2) Regurgitation.** When fluid runs backwards up the oesophagus it can cause a number of symptoms that all can be grouped together and described with this word. Sometimes patients feel fluid that washes up their oesophagus when they bend forwards, some get burning sensations high up in their chest when they lay down or go to sleep, and some report waking up with acidic fluid in their mouth at night or staining their pillow. At its worst, regurgitation can lead to terrifying episodes of choking when people wake up unable to breathe. If patients regurgitate gas mixed with fluid it can get into their lungs and cause pneumonia.
- 3) Epigastric pain.** Patients often struggle to describe this symptom. When pain occurs at the point where the breast-bone meets the abdomen is often hard to figure out where it is exactly. This type of pain occurs commonly in patients with reflux, gastric or duodenal ulcers and gallstones so it can create quite a dilemma for patients and their Doctors.
- 4) Chest Pain.** This pain is often associated with a feeling of food getting stuck, chest tightness and pain in the jaw, back, or left arm. Sometimes it occurs when people eat or drink, and sometimes it happens in between meals. Feeling anxious or stressed can make it occur more frequently. This pain is often interpreted as cardiac or heart pain because the nerves that cause the pain also supply the heart. It is believed that this pain is caused by oesophageal spasm. Oesophageal spasm can occur if the oesophagus is irritated by acid, if food gets stuck when we eat or drink and when the oesophagus spontaneously spasms (cramps) as part of a disorder in its function.
- 5) Cough.** Repetitive coughing can be a symptom of reflux when acid or other toxic chemicals escape out of the stomach and irritate the larynx (voice box). Some patients are hypersensitive to these irritants in the same way that some people are intolerant to dust or chemicals in the air. Cough can also occur as a reflex triggered by chemicals near, but not in, the larynx.
- 6) Asthma/shortness of breath.** A feeling of chest tightness that limits the ability to take deep breaths or breath effectively is often called asthma. Some patients get asthma-like symptoms from reflux into their lungs, larynx or upper oesophagus. These type of symptoms often don't respond to usual asthma treatments.
- 7) Belching/gas trapping.** Belching, or discomfort relieved by belching is a common but not terribly specific symptom of many oesophageal and gastric disorders. Sometimes patients bring up gas, or feel that gas is trapped either above (oesophageal) or below (gastric) the diaphragm. Sometimes patients with chest pain feel that they can relieve their discomfort by belching which can be an indicator of oesophageal spasm, but in other patients belching can be a sign of gas trapping in the stomach or a weakness in the valve at the bottom of the oesophagus.
- 8) Bitter taste.** Some patients with reflux-like symptoms complain of a bitter taste in the back of their throat and in their mouth. This is almost never from reflux of stomach contents into the back of the mouth. While we sometimes fail to find the cause, there are many occasions when the bitter taste is caused by thick oesophageal mucus that the oesophagus produces when it feels it has become blocked off. A bitter taste in the morning, combined with coughing up thick sticky mucus is a classic symptom of oesophageal obstruction by a narrowing or spasm of the oesophagus.

### **Difficulty Swallowing (Dysphagia).**

This is a complex and often subtle symptom to describe. Any feeling of difficulty when swallowing that occurs on a regular basis is abnormal, but many patients will unconsciously change how they eat to avoid symptoms which will therefore delay them from seeking diagnosis and treatment. For example, if someone finds they can no longer comfortably eat chicken, meat or bread they will often just stop eating these things and carry on as though there is nothing wrong. Many people with swallowing difficulties will delay seeking medical help until they can no longer easily swallow liquids or when vomiting/regurgitation disturbs their mealtimes. When asking about difficulty swallowing we wish to find out if they can tolerate solid food, soft food or liquids. Obviously those with intolerances to a wider range of foods have more significant underlying problems. Some find their intolerances occur all the time, whereas some patients have sporadic symptoms. Disorders that cause dysphagia can also be associated with chest pain, breathlessness, belching, regurgitation and a bitter taste in the mouth so misdiagnosis as “reflux” is extremely common.

Chest pain, epigastric pain.

### **Reflux. Causes, diagnosis and treatments.**

Reflux occurs when gastric content leaves the stomach and moves up to irritate the oesophagus, voice-box or lungs. This is not something that is supposed to happen frequently in healthy people, and it occurs only when the pressure inside the stomach becomes greater than the pressure keeping the lower oesophagus closed.

The four main causes of reflux are:

- 1) Hiatus hernia
- 2) Weak lower oesophageal sphincter (valve)
- 3) Oesophageal Sensitivity
- 4) Gastroparesis (paralysed stomach)

#### Hiatus Hernia

The point where the oesophagus passes through the chest into the abdomen is called the hiatus. At the hiatus the oesophagus is wrapped by a clasp of muscle that keeps it closed so that stomach acid doesn't squirt up out of the stomach whenever we cough or eat a big meal. When someone has a hiatus hernia the stomach gets pushed into the chest, so that when we eat a big meal, cough or lie down the acid in the stomach can easily flow up the oesophagus and cause reflux symptoms.

#### Weak Lower Oesophageal Sphincter

The lower oesophagus has a valve that is usually closed. It opens when we swallow otherwise food would get stuck in our chest when we eat. If this valve is weak, or if it opens at the wrong time, anything that increases pressure in the stomach will allow stomach content to move back into the oesophagus. 2/3 of the strength of the lower oesophageal valve strength comes from the Hiatus, but regulation of lower oesophageal valve closure is a bit complex. Coffee, chocolate, spicy foods and alcohol make the valve open it up, so does any meal, depending on its size. After we eat it's normal for the valve to open a little, in order to allow gas to that we have swallowed while eating to escape. In many people with reflux symptoms their lower oesophageal valve opens too frequently, and this leads to gastric content heading up the oesophagus. This is why most people with reflux learn to manage their symptoms by managing what they eat and drink.

#### Oesophageal Sensitivity

This is a complex topic, and more worthy of a conversation than an essay. There are hundreds of chemicals in the stomach. If you experience reflux of stomach content into the oesophagus its often your sensitivity to what's in your stomach that determines your symptoms rather than the volume. This

is why so many people with bad reflux have normal endoscopies. The fluid that they reflux is irritates their oesophagus but causes no obvious damage.

#### Gastroparesis

If your stomach doesn't empty after you eat it remains full of fluid and food after you eat, like a high-pressure balloon. If the pressure in your stomach is very high you may feel reflux/regurgitation, bloating and left sided pain and fullness after small meals.

### **Diagnosis and treatment.**

When people develop symptoms of reflux or difficulty swallowing (dysphagia) we want to offer them treatment to improve their symptoms and at the same time try to determine what condition is causing their symptoms. If you treat the symptoms but take no action to treat the underlying condition you may miss the opportunity to treat it effectively. While it's ok to offer young (under age 50) patients treatment for simple reflux symptoms without performing any tests, older patients and those with swallowing problems need investigations performed to exclude more dangerous conditions. The majority of patients will have tried several treatments before being assessed for a diagnosis.

#### **Diagnostic Tests.**

The majority of people who experience "reflux" symptoms undergo a trial of antacid or acid suppression medication prior to being tested to see if they have any underlying disorder or medical condition. If symptoms don't improve quickly, if the person is over 50, or symptoms of difficulty swallowing (dysphagia) are present then investigation to rule out serious conditions are worthwhile. No single test is able to diagnose every condition or its severity so patients with complex problems can sometimes need to undergo several tests before they get an accurate diagnosis or management plan. Prolonged treatment without an accurate diagnosis can be unhelpful to patients, but so can "over investigation". Tests often performed include;

- 1) Testing for H Pylori. Helicobacter Pylori is a bacteria that lives in the stomach of some patients. It is the most common cause of gastric and duodenal ulcers and eradication of the bacteria will successfully fix ulcers in most patients and prevent their recurrence. While the majority of gastric and duodenal ulcers are caused by H Pylori, only a minority of people with H Pylori will develop ulcers, so eradication of the bug if detected will often not make most people "feel better" unless they have an ulcer. H Pylori can be detected by a blood test, a breath test or by a biopsy taken at endoscopy.
- 2) Abdominal ultrasound and CT. Using radiology techniques to look at internal organs is a useful way of picking up a number of conditions that are not related to reflux or ulcers but have similar symptoms. An ultrasound is a very safe and effective way of picking up gallstones especially. Abdominal CT (computerised tomography) is effective for a range of abdominal conditions, but it does involve a significant radiation dose so it is often not a "first line" test.
- 3) Endoscopy (gastroscopy). Under a light anaesthetic a flexible camera is passed through the mouth, behind the voice-box and down to the oesophagus, stomach and duodenum. A gastroscopy is used to diagnose reflux, ulcers or inflammation in the oesophagus, stomach and duodenum, as well as a hiatus hernia and cancerous or pre-cancerous changes in the upper gut. Patients with difficulty swallowing, with new symptoms in the upper gut area over the age of 50 and patients with persisting symptoms after simple treatments will usually be offered a gastroscopy to help diagnose their condition.
- 4) Barium swallow. This x-ray test is often used in patients with dysphagia, either before or after endoscopy. It is effective at helping diagnose hiatus hernia, oesophageal blockages and abnormalities in oesophageal contraction.
- 5) Oesophageal function tests. These tests are very accurate, and are used to evaluate the severity of reflux when simple treatments are ineffective and to diagnose specific swallowing disorders such as Achalasia. Any patient having surgery for severe reflux, or treatment for swallowing disorders will need these tests performed.

## Oesophageal Testing

### Dysphagia/Swallowing Function tests.

**Barium Swallow.** This is an X-Ray test whereby someone swallows a thick fluid +/- bread or a marshmallow and the progress of what they have swallowed is followed on x-ray from the mouth and down into the stomach. This is a quick, painless and simple test that can be done at many X-ray labs. It is an easy test to organise when someone has unexplained swallowing problems or reflux, but it isn't as accurate as manometry (see below).

**Manometry.** This is the single most important test we can do on someone with a suspected oesophageal disorder. After some local anaesthetic is swallowed and sprayed into the back of the nose a fine catheter is passed via the nose into the oesophagus in order to measure the strength and co-ordination of oesophageal contraction and to measure the function of the muscular sphincters that are at the upper and lower end of the oesophagus. The catheter is passed relatively easily for the large majority of people and takes about 5 minutes during which time you are asked to swallow a couple of mouthfuls of water, and soft food. We choose different catheters depending on what information is wanted, and in general a large amount of information can be obtained from what is a relatively simple test.

**Reflux tests.** These are used when patients have persisting bothersome symptoms of reflux despite adequate treatment. The aim of these tests are to determine the severity of oesophageal acid exposure and the relationship between reflux and symptoms. We can measure acid at the lower and upper ends of the oesophagus over a 24 hour period and also measure non-acidic and weakly acidic reflux in patients where bile reflux or other problems are felt to be responsible for symptoms.

### Testing methods.

**Catheter Studies.** The most common method of testing reflux is using fine catheters (approx. 3 mm wide) which are connected to an electronic device the size of a mobile phone. In order to introduce the catheter we spray the back of your nose and throat with local anaesthetic so passing the catheter down is straightforward and free of trauma. Only a small minority of patients fail to tolerate the catheter, and problems such as nose bleeds are very rare. Once the catheter has been placed people head home with a plan to eat and drink normally and to press a symptom button every time they get symptoms. It is important that patients do the things that may bring symptoms on while they are having the test done and to record symptoms when they occur otherwise the test result may be negative. The following day the catheter is removed and the results analysed.

**Catheter Free Studies.** Another method of reflux testing which avoids catheters involves using endoscopy to place a single-use probe onto the oesophagus to perform measurements, the probe contains a battery and is connected wirelessly to an electronic device the patient carries in their pocket. The probe will measure reflux over a 48-72 hour period, after which time it detaches from the oesophagus and passes harmlessly into the toilet. This helps avoid the potential discomfort of having a catheter attached to your nose for 24 hours, but it requires an anaesthetic and endoscopy for placement and is more expensive for the person having the test performed.

## Reflux Treatment.

### **Medications. Reduce acid but don't reduce reflux.**

These medications reduce exposure of acid to the oesophagus, but will not change non-acid or weak acid reflux events. They are very safe however there are a lot of misunderstandings about how they work. These medications reduce the strength of acid that the stomach produces so that reflux episodes can occur without causing discomfort.

**Antacids.** Rennie's, Gaviscon, Mylanta etc. These agents neutralise acid to reduce symptoms.

**Acid Suppression Tablets.** (medical term = proton pump inhibitors, PPI's). Nexium, Somac, Pariet, Losec, Omeprazole, Zoton etc. These medications reduce the amount of acid the stomach produces but have no effect on the total volume of fluid that the stomach and duodenum produce. If someone takes a tablet for "reflux", the total number of reflux episodes they experience during the day are likely

to be relatively unchanged, it's just that the medications weaken the acid to that the majority of reflux episodes occur without the person being aware that they are happening.

**“Old fashioned” Acid Suppression tablets.** Zantac, Tasac etc. while significantly less powerful than PPI therapy, they are stronger than antacids and can be used in patients who still have symptoms while on PPI therapy.

**Gastric Motility agents.** Motilium and Maxalon speed up gastric emptying. If someone has reflux that stays severe despite acid suppression and agent such as this can help reduce the amount of extra fluid in the stomach and therefore make reflux symptoms less likely.

### **Anti-reflux Procedures**

These work by correcting/repairing the mechanical causes of reflux. The larger the procedure the more effective, but the larger the procedure the more important it is that accurate tests are done in order to avoid overtreatment and side effects.

Endoscopic surgical therapies. These incisionless procedures require an anaesthetic and are performed from within the oesophagus and stomach.

#### **Stretta procedure.**

With this procedure Radiofrequency energy is introduced to the lower oesophagus to “tighten it”. This is identical to the treatment that people have to reduce wrinkles on their faces by tightening their skin. Stretta has no direct effect on the lower oesophageal muscles, but it does reduce reflux symptoms in people who no longer wish to take antacid medications.

#### **RAP.**

Endoscopic Resection And Plication.

With this procedure the junction of the oesophagus and stomach is tightened by bunching up some of the upper stomach to act as an extra cushion below the lower oesophageal valve. It may be ideal for people without significant hiatal hernia where the reflux is caused by a weak or inappropriately relaxing lower oesophageal valve. In people with larger hiatal hernias it isn't possible to do it safely or effectively.

### **Laparoscopic Surgical Procedures.**

These all have a lot in common. General anaesthesia, 1-2 night hospital stay, mostly 5mm incisions and the ability to correct hiatal hernia which is the greatest driver of reflux in most people with reflux associated with oesophagitis (oesophageal ulcers) or Barrett's oesophagus.

#### **Hiatus hernia repair and fundoplication.**

The aim of this procedure is mostly to restore normal anatomy. Most people with reflux have symptoms that progress over years. This progression is mostly due to a gradually enlarging hiatus hernia with more and more stomach delivering more and more acid up into your chest. To repair a hiatus hernia, the stomach is first pulled back into the abdomen and then the hiatal muscles are tightened to snug around the oesophagus. In those who are identified to have very weak lower oesophageal valves the upper part of the stomach can be wrapped around the lower oesophagus, a “fundoplication”. Wrapping the stomach around the oesophagus creates an additional clasp around it which helps prevent reflux from occurring.

#### **Hiatus hernia repair and Linx procedure.**

One problem with fundoplication is that some people after this type of surgery can end up experiencing bloating and the inability to belch as well as problems swallowing if the fundoplication is too tight. This is because fundoplication's are designed to increase lower oesophageal pressure, but they can't vary the pressure they apply accurately. They can be just right (minimal reflux, minimal bloating), too tight (no reflux but some difficulty swallowing, no belching or ability to vomit, risk of bloating after meals) or too loose (reflux persists; however, some fundoplication side effects may also

exist). The Linx device is a device that keeps the oesophagus closed when you are not eating but it completely opens when you eat or try to belch. In this way it provides potentially better reflux control than a fundoplication but with less side effects.

### **Dysphagia Predominant Syndromes. Motility disturbances.**

Dysphagia (I can't swallow properly) is quite common in association with oesophageal disorders like reflux, hiatus hernia or when someone has an oesophageal blockage from an ulcer or tumour but sometimes it can occur without an obvious physical blockage. If someone experiences pain, blockages or regurgitation after they swallow but there "isn't anything to see" on endoscopy then that person has a problem with the way their oesophagus works. This is similar to a car engine or TV that looks normal, however it doesn't work correctly because the electrical components are broken.

Oesophageal motility symptoms are often mistaken for reflux. This is because either the person regurgitates food or saliva in their oesophagus, because the oesophagus can produce bitter tasting fluid that people mistake for stomach acid, or because oesophageal spasm can cause pain similar to heartburn pain. If someone feels they have "reflux", but they get no benefit from anti-reflux medications they probably have a motility disorder.

### **Diagnosis of motility disorders.**

Every person who has difficulty swallowing must have an endoscopy. An endoscopy will not diagnose most oesophageal disorders, but it does exclude the ones which are potentially life threatening. Once an endoscopy has been performed the next test depends on the severity of symptoms. If someone has a normal endoscopy and wants to pursue further options to help their symptoms, then tests designed to diagnose oesophageal disorders are required.

**Manometry.** This is the only test able to reliably provide diagnosis of an oesophageal disorder. Other tests can suggest a diagnosis but can rarely make one. Manometry measures oesophageal valve function, oesophageal co-ordination and power, but also how the oesophagus can process liquid and solid swallows.

**Barium Swallow.** Because this test examines the oesophagus while someone swallows it is effective at showing major blockages but cannot measure oesophageal co-ordination, power or valve function. If someone has significant symptoms and a normal barium swallow, further investigations will be needed.

### **Motility Disorders.**

#### **Achalasia.**

Is an uncommon disorder although with increasing sensitivity of our tests we are likely discovering more people affected by it. People with achalasia complain of dysphagia (food getting stuck), regurgitation/reflux, weight loss and chest pain. Most people will have 2 or more of these symptoms, but some will only have 1. Achalasia creates symptoms that come on reasonably quickly however most patients will spend many weeks, months or years putting up with incorrect diagnoses and treatment because their oesophagus often looks normal when they have an endoscopy done.

Achalasia is a disorder with 2 components

- 1) Absent or abnormal peristalsis (contractions) so that food isn't pushed down the oesophagus when they swallow.
- 2) Non-relaxing lower oesophagus. If the lower oesophageal valve (sphincter) doesn't open when someone swallows then food gets stuck in the lower oesophagus and causes pain, regurgitation and chest pain.

The treatments we have are directed towards the lower oesophageal sphincter. If someone is diagnosed and treated early enough then some of the other function of the oesophagus can recover, but in most cases peristalsis of the oesophagus remains abnormal.

Diagnosis. As anyone who has difficulty swallowing needs an endoscopy, this is usually the first test performed. Some may also end up having barium swallow x-rays, but the only diagnostic test is Manometry.

Treatment. Mostly treatments are directed towards loosening the lower oesophagus. Sometimes medications like blood pressure tablets or heart tablets can be tried to reduced pain, however these medications usually have fairly minimal effect.

Therapy which are known to be effective are:

- 1) Botox injection. This is a simple and safe procedure whereby botox is injected into the lower oesophageal valve to loosen it. This will improve symptoms in 2/3 patients however it wears out over 6+ months so isn't suitable for long term treatment. Each time the botox injection is repeated it is less likely to be effective, and it also eventually leads to scarring which makes other treatments riskier.
- 2) Endoscopic Pneumatic Dilation. During an endoscopy a balloon of 30 mm or more size is dilated in the lower oesophagus to stretch and rupture oesophageal muscle fibres. The treatment usually needs to be performed 4 times over a couple of years to get an 80% success rate. Each time the procedure is performed there is a 1% chance of a serious oesophageal injury, so this often means that many patients end up accepting a fairly poor swallowing outcome rather than risking further endoscopies.
- 3) Endoscopic Myotomy (Per oral endoscopic myotomy or POEM). With this procedure an endoscope is used to cut the muscle of the lower oesophagus and fix the blockage. The procedure takes a bit over an hour to perform in most people and it requires a full anaesthetic and a 2-day hospital stay. One treatment will lead to >85% relief from swallowing problems and recovery is reasonably quick. There is about a 1% chance of oesophageal injury or other complications with this treatment. POEM has become the preferred method of achalasia treatment for most clinicians and patients.
- 4) Laparoscopic (surgical) Myotomy. Heller myotomy. This is a keyhole operation using mostly 5mm incisions where the lower oesophageal sphincter is cut, and a piece of stomach sutured to the lower oesophagus as an anti-reflux valve. The risks and hospital stay are similar to POEM but recovery is usually a little slower. The Heller myotomy has the best known long term results but is now becoming less common.