Addenda

N.B. This is an interim document of a few minor revisions and additions for the reprint (second edition) due September 2017.

Barrett’s Oesophagus  (Amendment and addition to complications section)

The size of the problem
(Just under 8000 people die each year from Oesophageal Cancer out of 64 million in UK, making the chances one in 8000. If there are 3 million with non-dysplasic Barrett’s*, their risk is one in 400.)

Britain tops the world for incidence of oesophageal cancer where it is the fifth greatest cancer killer of men, claiming the life of one person an hour on average in the UK. [c-ii]

If it is going to occur, the progression is usually slow initially but by the time cancerous cells develop, it’s frequently too late to treat with life expectancy measured in weeks rather than years.

* A paper published in 2014 [c-iii] suggests one in 20 have Barrett’s. Applying that to the UK population implies there may be 3 million people with Barrett’s though fewer than 150,000 know it. If the others can be identified, it may be possible to prevent this large number of deaths.

Annual risk of oesophageal adenocarcinoma at each stage of Barrett’s Oesophagus:

How Barrett's Oesophagus Forms

Your stomach is like this water balloon but instead of water, it holds very concentrated hydrochloric acid and instead of fingers holding the top closed, there are two sets of muscles at the base of the ribcage, together known as the Lower Oesophageal Sphincter (or LOS).

If you tip or squeeze the balloon when it's full, it will leak unless it is held tightly closed. With the stomach, that would mean concentrated acid leaking into the tube above, the oesophagus, which it may attack and is frequently experienced as heartburn or acid reflux.

The oesophagus is the tube food passes down from the throat, through the chest to the stomach.

At the bottom of the chest, it has to pass through a hole in the diaphragm, breathing muscle, which is one of the main muscles forming the LOS. This hole is called the “Hiatus”.

In many people, some of the stomach pushes up through this hole into the chest – a condition known as a hiatus hernia. When this happens, the muscles do not line up properly so reflux is more likely to occur.

Hiatus hernias may develop for many reasons - you can even be born with one, but for most people it is unlikely to cause any problems - apart from perhaps, occasional, mild heartburn which we may treat with an antacid.

Spill concentrated acid on your hand and you'll be scarred for life. The lining of the oesophagus makes mucous to help protect the inner surface but it may not help against a tide of acid reflux and cause scarring and inflammation known as oesophagitis.

Acid will not break down fats and animal tissue so, in the same way as we use detergent to allow water to remove grease from a plate, sometimes some bile is needed to help.

If bile also refluxes into the oesophagus along with the acid, it may start to break down the tissue lining the oesophagus and the body could start to digest itself. For protection, some of the normal cells may be replaced with acid-resistant cells like those found in the intestines.

This is the condition known as Barrett's Oesophagus.

However, these changed cells have the ability in some people to mutate to cancer.
Are Proton Pump Inhibitors dangerous? (Addition to Medicines section)

If newspaper headlines are to be believed, the popular acid suppressant drugs can cause osteoporosis, anaemia, hypomagnesaemia, C-difficle infection, heart attacks, kidney disease, dementia, cancer - and a host more.

PPIs are powerful acid suppressant drugs originally designed to help cure gastric ulcers. It was initially considered a few weeks treatment would be all that was required. However their use in combatting acid reflux has led them to become one of the most popular drugs worldwide used by millions in the 30 years since their introduction and many people are on them for life.

Problems started being reported when these powerful drugs were made available over the counter in the USA and quickly led to FDA warnings.

Many people suffering the misery of indigestion use antacids. When a new drug that purports to last longer and be more effective was found next to their usual, but not so effective, Tums, many of those sufferers turned to them instead. Most people do not read the inserts in packs of tablets so it's likely many of those customers misused them. They are not on-demand medication like Tums. It's probable too many people dosed themselves too frequently or with too much. There is research evidence to show that reported problems with these drugs are highest amongst self-medicators.

If found to be necessary for more than a few weeks, the use of these drugs should be monitored by a doctor to ensure patients have the smallest effective dose for the shortest necessary time and taken correctly - ie pre-emptively at the same time each day which is probably best half an hour before breakfast.

They may be too good at doing their job of reducing acid production; too much for too long can induce a condition known as hypochlorhydria when the body has insufficient stomach acid.

Stomach acid is required to help leech essential minerals and vitamins from food, turning them into chlorides which may be absorbed into the bloodstream in the duodenum.

Hypochlorhydria can result in malabsorption of calcium - exacerbating osteoporosis, iron - exacerbating anaemia, magnesium etc.

Hypochlordydria can also result in reduction of the body's natural defences against harmful bacteria like C-difficile.

If you use PPIs at a high dose for many years, you may find you need supplementation of essential minerals and to boost your immune system with probiotics. But speak to your doctor about your concerns.

PPIs have been linked to Myocardial Infarction [AD-i]. That those with heart conditions may be greater amongst those taking PPIs is not surprising since the symptoms of heart attack and indigestion can be so similar. The "evidence" shows a correlation not a causation.

Similarly PPIs have been associated with Chronic Kidney Disease. [Ad-ii] Again this showed a correlation: those with kidney problems are more likely to be users of PPIs.

Another study looking at the medicines used by patients over the age of 75 with dementia, found a higher
Another paper published in 2013 appeared to show PPIs could cause oesophageal cancer [Ad-v].

This quickly received rebuffs such as this letter: proton pump inhibitor usage still seems to reduce the risk of high-grade dysplasia and/or oesophageal adenocarcinoma in Barrett’s oesophagus. [Ad-vi]

The popular media loves scare stories like these and, never letting the facts get in the way of a good story, can exaggerate them causing real fear amongst some PPI users who often try turning to unproven "natural" remedies for their condition that may do more harm than good.

There has been research however that shows PPIs most probably have a chemo-protective effect helping reduce incidences of oesophageal cancer as published in a recent meta-analysis: “PPI use was associated with a 71% reduction in risk of OAC and/or BO-HGD in patients with BO” [Ad-vii]

This paper, "PPIS display antitumor effects in Barrett’s adenocarcinoma" also found "evidence supporting the potential use of PPIs as novel antineoplastic drugs for EAC". [Ad-viii]

References:
[Ad-vi] Proton pump inhibitor usage still seems to reduce the risk of high-grade dysplasia and/or oesophageal adenocarcinoma in Barrett’s oesophagus (Alimentary Pharmacology & Therapeutics) http://onlinelibrary.wiley.com/doi/10.1111/apt.12892/full
[Ad-vii] Acid-suppressive medications and risk of oesophageal adenocarcinoma in patients with Barrett’s oesophagus (Gut) https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4199831/
Prevalence of Extra-Oesophageal Reflux symptoms amongst acid refluxers and perceived efficacy of regular medication and reflux reduction intervention.

(To be used to amend Extra-oesophageal Reflux chapter)

Chris Robinson (Chairman of Barrett’s Wessex) June 2017

Abstract

A previous anecdotal survey of acid reflux patients (Aspiration of Upper Oesophageal Reflux – August 2014, Robinson C) had identified over 14 extra-oesophageal reflux symptoms evinced extensively amongst acid refluxers. Based on those findings, this study sought to confirm the prevalence of those symptoms and the efficacy of Acid Suppressant Medication and Anti-Reflux Surgery to manage them.

Conclusion. Two thirds of patients on ASM still suffered with symptoms of EOR whilst ARS reduced symptoms by 57%.

Recommendation: Patients predominantly exhibiting reflux symptoms should be considered for anti-reflux intervention rather than continued acid suppressant medication.

Methodology

Three parallel surveys were set up targeting different patient groups but using the same questions based on a rationalisation of the symptom list established by the 2014 study into 8 symptom groups concentrating on throat, chest, ears, eyes, nose and mouth manifestations.

Surveys were set up using Survey Monkey and targeted at different Facebook groups.

Analyses and results

Survey 1 targeted refluxers from the “Acid Reflux / GERD /LPR” Facebook support group who didn’t use daily pre-emptive medication but who may use occasional on-demand antacids as and when required. Over the collection period, 51 responses were garnered.

As will be seen in Table 1, throat symptoms were most commonly identified with 63% reporting hoarseness, sore throat, loss of voice, throat clearing as a symptom. The prevalence of the other symptom categories may be seen in table 1: 45% reporting globus, 43% post nasal drip, sinusitis of catarrh, 33% bad breath or taste in mouth, 31% dry or gritty eyes, 31% ear problems: waxing, glue ear, tinnitus or dizziness, 27% chest complaints, cough or asthma like symptoms and 22% dental problems.

Survey 2 targeted refluxers using daily medication from the “Barretts Esophagus Awareness” Facebook group. An initial question identified their usage of H2 blockers or Proton Pump Inhibitors at different doses. The maximum 100 responses were collected within 24 hours. Of those, 5 relied on H2 blockers, 13 on low dose PPI, 44 on high dose PPI (with 2 using H2 blockers to supplement) and 37 on high dose PPI (with 4 using H2 blockers to supplement).
(A medium dose was identified as 20mg omeprazole = 30mg lansoprazole = 40mg pantoprazole = 20mg rabeprazole = 20mg esomeprazole = 30mg dexlansoprazole with anything less regarded as low dose and anything more as high dose.)

As with survey 1, the most prevalent reported symptom was concerned with the throat: hoarseness, sore throat, loss of voice and throat clearing reported by 66% of refluxers.

The prevalence of the other symptom categories may be seen in table 1: 50% report experiencing globus, 49% nasal problems, 48% ear problems, 46% cough, 44% oral, 42% eyes and 26% dental problems.

It is assumed those with the most prolific symptoms are the predominant users of ASMs. (It is strongly cautioned against jumping to any false conclusions that PPIs actually result in higher incidence of EOR symptoms.)

The dosage level seemed to make little difference. Those on H2 blockers averaged 3 symptoms from the list, on low dose PPI, 3.5 symptoms, medium dose 3.8 symptoms and high dose users 3.6 symptoms.

Survey 3 targeted recipients of anti-reflux intervention via “The Wrap (Nissen Fundoplication)” Facebook group. This used the same questions but required responses of pre and post intervention. 52 responses were amassed during the collection period.

The results are shown in table 2:

Pre intervention, 73% reported the throat issues and 58% globus with 50% reporting cough, 50% oral, 44% nasal, 35% aural, 33% eyes and 33% dental problems.

All but 2 repondees had received Nissen fundoplication, one had had Linx successfully and one had had Stretta unsuccessfully.

Post intervention, reported throat issues had been reduced to 35% oral problems 29%, globus 25%, cough 19% nasal problems 19%, eye problems 17%, ear problems 13% and dental erosion 10%.

A cumulative score of prevalence of symptoms reduced from 47% to 20% as a result of ARS.

Conclusions

In the management of symptoms of extra-oesophageal reflux, acid suppressant medication did not appear to be effective whereas reflux reduction surgery was.

For those exhibiting symptoms of extra-oesophageal reflux, reflux reduction should be considered in preference to acid reduction.
Table 1

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>Not taking regular medication</th>
<th>Taking regular medication</th>
</tr>
</thead>
<tbody>
<tr>
<td>THROAT: Hoarseness, sore throat, loss of voice, throat clearing</td>
<td>63%</td>
<td>66%</td>
</tr>
<tr>
<td>CHEST: Chronic cough or asthma like symptoms</td>
<td>27%</td>
<td>46%</td>
</tr>
<tr>
<td>NOSE: Post nasal drip, Poor sense of smell, sinusitis, catarrhal symptoms</td>
<td>43%</td>
<td>49%</td>
</tr>
<tr>
<td>THROAT: Globus, feeling of lump in throat.</td>
<td>45%</td>
<td>50%</td>
</tr>
<tr>
<td>MOUTH: Tooth erosion</td>
<td>22%</td>
<td>26%</td>
</tr>
<tr>
<td>MOUTH: Bad breath or bad taste in mouth</td>
<td>33%</td>
<td>44%</td>
</tr>
<tr>
<td>EYES: Dry or gritty eyes</td>
<td>31%</td>
<td>42%</td>
</tr>
<tr>
<td>EARS: Waxing, Glue Ear, Tinnitus or dizziness</td>
<td>31%</td>
<td>48%</td>
</tr>
</tbody>
</table>

Table 2

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>Before intervention</th>
<th>After intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>THROAT: Hoarseness, sore throat, loss of voice, throat clearing</td>
<td>73%</td>
<td>35%</td>
</tr>
<tr>
<td>CHEST: Chronic cough or asthma like symptoms</td>
<td>50%</td>
<td>19%</td>
</tr>
<tr>
<td>NOSE: Post nasal drip, Poor sense of smell, sinusitis, catarrhal symptoms</td>
<td>44%</td>
<td>19%</td>
</tr>
<tr>
<td>THROAT: Globus, feeling of lump in throat.</td>
<td>58%</td>
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<td>MOUTH: Tooth erosion</td>
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</tr>
<tr>
<td>EYES: Dry or gritty eyes</td>
<td>33%</td>
<td>17%</td>
</tr>
<tr>
<td>EARS: Waxing, Glue Ear, Tinnitus or dizziness</td>
<td>35%</td>
<td>13%</td>
</tr>
</tbody>
</table>

References to be added.
FOOD  (New section)

Acid and Alkali foods
The acidity or alkalinity of what we consume actually has little or no bearing on the acid production of the stomach. Stomach acid is produced by the parietal cells in the stomach in response to action of neurotransmitters histamine and acetylcholine. It is highly concentrated hydrochloric acid that can dissolve metal. If you pour vinegar (an acid) on your hand, it will feel wet. Pour battery acid on your hand and it will cause damage. Pour vinegar on the damaged area and it will hurt; it's not the vinegar that's caused the problem but the concentrated acid. Despite the many articles on "health" websites extolling the values of alkaline diets, they do nothing to reduce stomach acid.

Acidity is measured in terms of pH. pH7 is neutral: anything below is acid and anything above is alkaline. Stomach acid "at rest" is usually pH4 but can reach pH1 when "active". (Vinegar is pH4.)

Foods that may cause reflux
Some drugs (like caffeine and alcohol) may cause the muscles of the lower oesophageal sphincter to relax which could exacerbate reflux. However, for those experiencing frequent reflux, their sphincter is obviously malfunctioning anyway and the drugs' actions may make little difference. Anything causing a build up of gas in the stomach may cause reflux. This includes beans, brassicas (cabbage, cauliflower, etc), salad vegetables (cucumbers, radishes etc), fruits, grains, dairy products, breads and cereals etc. Perhaps sounding counter-intuitive, sipping plain soda water can help by permitting a controlled burp to release the gas.

Know your triggers
Some acid refluxers may be affected by some foods. They are their trigger foods. However, as everyone is different, not everyone is affected in the same way by the same foods. We don't know why some foods act as a trigger for some and not others. It could be to do with the foods we were weaned on, our environment or even the food choice of our mothers whilst we were still in the womb.

To determine your food triggers, you should keep a food diary writing down the components and times of meals and recording any possible consequences. Analysing your log after a week or two may identify common elements that caused your reflux. These items are frequently found on people's trigger foods lists but they may not affect you. If unaffected, you don't need to avoid them: Spicy Foods, Citrus fruits, tomatoes, dairy products, fatty foods, soda, coffee.
Some food myths

Coffee. Although the caffeine content may relax the sphincter, research has shown that for most acid refluxers, coffee need not be avoided. There have been a number of studies looking at the effects of coffee. A study of over 8000 patients in Japan in 2012 [fd-i] found "No association of coffee consumption with gastric ulcer, duodenal ulcer, reflux esophagitis, and non-erosive reflux disease."

And a study published by American Gastroenterological Association in May 2016 [fd-ii] found "Coffee or Tea, Hot or Cold, Are Not Associated With Risk of Barrett’s Esophagus."

Alcohol. A search through the Barrett’s Wessex accumulated archive of research links relevant to reflux, Barrett’s etc, from all reputable journals over the last 5+ years [fd-iii], found 9 studies showing alcohol had no harmful effect on Barrett’s Oesophagus:
"alcohol consumption is not a risk factor" (Gut 2005)
"No significant effects of alcohol consumption" (Digestive Diseases & Sciences 2013)
"Alcohol drinking is not associated with risk of neoplastic progression in Barrett's esophagus." (PLoS one 2014)
"we found no evidence that alcohol consumption increases the risk of Barrett’s esophagus." (American Journal of Gastroenterology 2014)
"alcohol consumption ... [did] not seem to have any impact" (Gastroenterology Research & Practice 2014)
"Alcohol consumption ... [is] not associated with the condition." (Gastrointestinal Tumors 2016)

In fact 2 studies seemed to show it may actually have a beneficial effect.
"Significant inverse association was observed between alcohol consumption and BE," (Medicine Baltimore 2016)
"The limited data available on alcohol consumption supports a tentative inversion of alcohol consumption with BE risk in women" (Scientific Reports 2015)
(Alcohol was, however, considered to have a detrimental effect on the development of squamous cell cancer.)

Alkaline Water. Heavily promoted by those who hope to profit from its sale, only one study has shown any positive effects from alkaline water [fd-iv]. It was not replicated by peer review and not produced by a gastroenterologist but an ENT specialist who may be a beneficiary of companies selling the product.

These articles have debunked any claims alkaline water may provide:
Alkaline Water Hoax [fd-v]
Alkaline Water Helps neutralize Heartburn Symptoms? Doctors Debunk Claims [fd-vi]
The Doctor is in: Water, water everywhere - which drop should we drink? [fd-vii]
How we eat is important
Our modern lifestyle is much to blame for an increase in acid reflux and its associated problems.
We are prone to eat too much and too quickly and probably the wrong foods, too. (For instance fatty or processed meats need longer to break down in the stomach so should not be eaten in a rush, "on the go".)
When we eat, we need to eat small portions to avoid over-filling the stomach. We should eat slowly to permit each food bolus to enter the stomach and start being processed before the next is sent on its way.
Chewing each mouthful well will stimulate secretion of saliva and mucous to protect and lubricate the oesophagus to facilitate peristalsis to the stomach.
Keeping upright whilst eating is important for gravity to help.
A 1999 study on The role of diet and lifestyle measures in the pathogenesis and treatment of gastroesophageal reflux disease [fd-viii] stated, "A general consensus on the control of GERD through alterations in diet and lifestyle factors could hardly be based on the results of clinical or outcome studies."
This was further supported by a 2017 study Diet and GERD: Role in Pathogenesis and Management [fd-ix] stating, "Although anecdotal evidence has suggested associations with certain foods (fats, nonvegetarian, fried foods, and beverages) with reflux symptoms, objective evidence based data in this field remain unclear. Recent evidence points to the increasing importance of lifestyle in disease development as well."
And this item [fd-x] said, "It's Not Food Causing Your Heartburn—Here Are The 5 Real Culprits"

Exercise after food
After eating, the stomach should be allowed to empty before any activity which would result in it being squeezed, tilted or shaken.
It is probably best to abstain from activities like sit-ups, heavy lifting, bending down, running, swimming etc for an hour after eating.
However, gentle upright exercise is encouraged like walking which will help the food move from the stomach into the duodenum quicker.

References:
[fd-i] No Association of Coffee Consumption with Gastric Ulcer, Duodenal Ulcer, Reflux Esophagitis, and Non-Erosive Reflux Disease: A Cross-Sectional Study of 8,013 Healthy Subjects in Japan
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3680393/
[fd-ii] Coffee or Tea, Hot or Cold, Are Not Associated With Risk of Barrett’s Esophagus - Clinical Gastroenterology and Hepatology
http://www.cghjournal.org/article/S1542-3565%2815%2901616-X/fulltext
[fd-iii] Effects of Alcohol on Barrett's oesophagus
https://docs.google.com/viewer?a=v&pid=sites&srcid=ZGVmYXVsdGRvbWFpbmciYXJyZXR0c3dlc3NleG5ld3N8Z3g6NDg3YzgzMTUwZDRmYzk4ZQ

(New additions to ENT section)

**COPD** (Chronic Obstructive Pulmonary Disease) and asthma. Damage to the airways from particles in the air (eg smoke) or aspirated from reflux, can cause a narrowing of the bronchioles or blocking from mucous making exhaling difficult.

On the left is a diagram of the lungs and airways with an inset showing a detailed cross-section of normal bronchioles and alveoli. On the right are lungs damaged by COPD with an inset showing a cross-section of damaged bronchioles and alveoli.
Pulmonary Fibrosis  Also called Idiopathic Pulmonary Fibrosis (IPF) when the actual cause is unknown, the permanent scarring damaging the airways may be caused by irritants aspirated into the lungs from airborne particles (eg smoke) or refluxed from the oesophagus.

Figure A shows the location of the lungs and airways in the body. The inset image shows a detailed view of the lung's airways and air sacs in cross-section.

Figure B shows fibrosis (scarring) in the lungs. The inset image shows a detailed view of the fibrosis and how it damages the airways and air sacs.