

# Indigestion, antacids, achlorhydria and *H. pylori*.

by Michael T. Murray, N.D.

The term "indigestion" is often used to describe a feeling of gaseousness or fullness in the abdomen. It can also be used to describe "heartburn." Indigestion can be attributed to a great many causes, including not only increased secretion of acid but also decreased secretion of acid and other digestive factors and enzymes. The dominant treatment of indigestion is the use of over-the-counter preparations. These preparations include antacids which work by binding free acid, and drugs like Tagamet, Zantac, and Pepcid which inhibit the release of antacids by blocking histamine (H<sub>2</sub>) receptors including antacids.

The stomach's optimal pH range is 1.5 to 2.5 with hydrochloric acid being the primary stomach acid. The use of antacids and H<sub>2</sub>-receptor antagonists will typically raise the pH above 3.5. This increase effectively inhibits the action of pepsin, an enzyme involved in protein digestion that can be irritating to the stomach. Although raising the pH can reduce symptoms, it must be pointed out that hydrochloric acid and pepsin are important factors in protein digestion. If their secretion is insufficient or inhibited, proper protein digestion and mineral disassociation will not occur. In addition, the change in pH can adversely affect gut microbial flora including the promotion of an overgrowth of *Helicobacter (H.) pylori*. Therefore, it is important to use antacids wisely and sparingly.

In addition, many nutrition-oriented physicians believe that it is not too much acid, but rather a lack of acid, that is the problem. Typically, in addressing indigestion, naturopathic physicians use measures to enhance rather than inhibit digestion. Commonly used

digestive aids include hydrochloric acid and pancreatic enzyme preparations. This article will take a critical look at the use of these agents and contrast their use with natural digestive aids. The topic of *H. pylori* will also be addressed.

## General considerations

A 1983 article in the *American Journal of Gastroenterology* asked the question "Why do apparently healthy people use antacids?"<sup>1</sup> The answer: reflux esophagitis, the medical term for heartburn. Reflux esophagitis is most often caused by the flow of gastric juices up the esophagus leading to a burning discomfort that radiates upwards and is made worse by lying down. Reflux esophagitis is most often caused by overeating (remember that old Alka-Seltzer theme: I can't believe I ate the whole thing?). Other common causes include obesity, cigarette smoking, chocolate, fried foods, carbonated beverages (soft drinks), alcohol, and coffee. These factors either increase the pressure within the stomach, thereby causing the gastric contents to flow upwards, or they decrease the tone of the sphincter between the stomach and the esophagus that normally prevents gastric reflux into the esophagus. The first step in treating reflux esophagitis is prevention. In most cases this step simply involves eliminating or reducing the causative factor.

For occasional heartburn, antacids may well be appropriate. However, they should not be abused. If heartburn is a chronic problem it may be a sign of a hiatal hernia, the out-pouching of the stomach above the diaphragm. However, it is interesting to note that only 5% of patients with hiatal hernias actually experience reflux esophagitis.

Perhaps the most effective treatment of chronic reflux esophagitis is to utilize gravity. The standard recommendation is to simply place four-inch blocks under the bedposts at the head of the bed. This elevation of the head is very effective in many cases.

Another recommendation to heal the esophagus is using deglycyrrhized licorice (DGL). Although DGL is primarily used for treating peptic ulcers, I have used it clinically in cases of heartburn with success. DGL is further discussed below.

## Common antacid medications

All antacids are relatively safe when used on an occasional basis for heartburn or indigestion. Taken regularly, however, they can lead to malabsorption of nutrients, bowel irregularities, kidney stones, and other side effects. There are several approved types of antacids. Each of these types are discussed below.

**Aluminum containing compounds:** Aluminum containing antacids include Maalox, Rolaids, Digel, Mylanta, Riopan, Wingel, Amphogel and AlernaGel. Although these antacids are potent and effective in neutralizing acid, there are some significant long-term safety concerns. There is ever-growing evidence to indicate that aluminum may play a role in impairing mental function as well as in diseases of the nervous system including Alzheimer's disease, dialysis dementia, Parkinson's disease, and Lou Gehrig's disease (amyotrophic lateral sclerosis).<sup>2-4</sup> Although manufacturers and the FDA tell us that the aluminum in antacids is not absorbed, this appears to be fraudulent information as absorption studies prove otherwise even when low-dose therapy is used.<sup>5-7</sup> Absorption of aluminum is



greatly enhanced if the meal contains any citrus fruit, orange juice, soda, or other sources of citric acid. The bottom line is there is no reason to use the aluminum-containing antacids at this time as the potential risk far outweighs the short-term benefit.

**Sodium bicarbonate:** Sodium bicarbonate is baking soda. Alka-Seltzer is simply ordinary baking soda in an effervescent form. Although sodium bicarbonate can be useful in short-term therapy, it is not indicated for chronic or prolonged therapy due to the risk of sodium overload. In addition, because the bicarbonate ion is rapidly absorbed, long-term administration can cause systemic alkalosis (excessive pH throughout the body). This can lead to the formation of kidney stones, nausea, vomiting, headache, and mental confusion.

**Calcium carbonate and calcium citrate:** An example of a calcium carbonate containing antacid is Tums. Although fast-acting and potent, calcium carbonate can produce what is known as acid rebound three or four hours after use. This means that the body will try to overcompensate the neutralization of gastric acid by secreting even more acid. This is not viewed as being clinically significant in the treatment of indigestion, but it may play a role in delaying ulcer healing.

Many physicians have been recommending Tums as a calcium supplement. In fact, calcium carbonate is the most widely used form of calcium supplement. While calcium carbonate is an effective antacid, there are better forms of calcium for supplementation.

In order for calcium carbonate and other insoluble calcium salts to be assimilated they must first be solubilized and ionized by stomach acid. This requirement is where the problem arises with calcium carbonate for many individuals. In studies with postmenopausal women, it has been shown that about 40% are severely deficient

in stomach acid.<sup>8</sup> Patients with insufficient stomach acid output can only absorb about 4% of an oral dose of calcium as calcium carbonate, while a person with normal stomach acid can typically absorb about 22%.<sup>9</sup> Patients with low stomach acid secretion need a form of calcium already in a soluble and ionized state, like calcium bound to Krebs cycle intermediates (e.g., citrate, malate, succinate, and fumarate) or lactate and aspartate. About 45% of the calcium is absorbed from calcium citrate in patients with reduced stomach acid compared to 4% absorption for calcium carbonate. It has also been demonstrated that calcium is more bioavailable from calcium citrate than from calcium carbonate in normal subjects as well.<sup>10</sup>

The strong alkaline nature of carbonate combined with the calcium that is absorbed greatly increases the risk of kidney stones, especially if milk products are a regular part of the diet. In contrast, the chemical nature of citrate is to actually prevent kidney stones from developing.<sup>11</sup> This along with its superior absorption clearly demonstrates that calcium citrate is much more beneficial than calcium carbonate as a calcium supplement. In addition, calcium citrate may be the best antacid as well. Calcium citrate is showing impressive results as an antacid (phosphate binder) in patients with kidney disease.<sup>12</sup> It is much better tolerated than aluminum-containing antacids. Although I am not aware of any calcium citrate preparations being marketed as antacids, preparations of calcium citrate or other calcium bound to other Krebs cycle intermediates are widely available.

**Magnesium compounds:** Magnesium salts such as magnesium oxide, hydroxide, and carbonate often appear in aluminum-containing products. Phillip's Milk of Magnesia is the only major brand that features only magnesium; it is a suspension of

magnesium hydroxide in water. In addition to acting as a mild antacid, magnesium hydroxide also exerts a laxative effect. It is a safe and effective product for people with normal kidney function, though diarrhea is a definite risk.

**H2-receptor antagonists:** These drugs work to block the action of histamine on the secretion of stomach acid. Histamine normally acts on the acid secreting cells of the stomach in a manner which results in the secretion of stomach acid. By blocking this effect of histamine, stomach acid output is greatly reduced. Examples of H2-receptor antagonists include cimetidine (Tagamet), ranitidine (Zantac), famotidine (Pepcid), and nizatidine (Axid).

Recently the makers of these drugs were able to successfully encourage the FDA to make them available over-the-counter. As a result, I believe we may see more problems with digestive disturbances and other side effects caused by these drugs. Since H2-receptor antagonists block a vital bodily function involved in digestion, digestive disturbances are quite common and can include: nausea, constipation, and diarrhea. Nutrient deficiencies can appear as a result of impaired digestion. Other possible side effects include: bacterial overgrowth (including overgrowth of *Helicobacter pylori*), liver damage, allergic reactions, headaches, breast enlargement in men, hair loss, osteoporosis, dizziness, depression, insomnia, and impotence.

### The natural approach to indigestion

Although some antacids are in essence natural products and have an appropriate use in treating occasional indigestion, in most chronic cases a more critical look at the problem of indigestion is needed. In the patient with chronic indigestion, rather than focusing on blocking the digestive process with



antacids, the natural approach to indigestion focuses on aiding digestion.

Digestion occurs as a result of both physical and chemical processes. The physical changes of food are brought about by grinding, crushing, and mixing of the food mass (chyme) with digestive juices during propulsion through the digestive tract. Chewing food thoroughly is the first aspect of good digestion. It is not only the mechanical effect, but also important is the mixing of the food with the saliva. Saliva contains the enzyme salivary amylase (ptyalin) which breaks down starch molecules into smaller sugars.

It is the role of the esophagus to transport food and liquids from the mouth to the stomach. The stomach primarily functions in the digestion of proteins and ionization of minerals. The stomach secretes hydrochloric acid, various hormones, and enzymes.

### Hydrochloric acid (HCl)

Although much is said about hyperacidity conditions, probably a more

common cause of indigestion is a lack of gastric acid secretion. Hypochlorhydria refers to deficient gastric acid secretion while achlorhydria refers to a complete absence of gastric acid secretion.

Many symptoms and signs suggest impaired gastric acid secretion, and a number of specific diseases have been found to be associated with insufficient gastric acid output.<sup>13-24</sup> These are listed in the charts on this page.

Several studies have shown that the ability to secrete gastric acid decreases with age.<sup>25-27</sup> Some studies found low stomach acidity in over half of those over age 60. The best method of diagnosing lack of gastric acid is a special procedure known as the Heidelberg gastric analysis.<sup>28</sup> This technique utilizes an electronic capsule attached to a string. The capsule is swallowed and then kept in the stomach with the aid of the string. The capsule measures the pH of the stomach and sends a radio message to a receiver which then records the pH level. Dr. Jonathan Wright believes the response to a bicarbonate challenge during Heidelberg gastric analysis is the true test of the functional ability of the stomach to secrete acid.<sup>29</sup> After the test, the capsule is pulled up from the stomach by the string attached to it.

Since not everyone can have detailed gastric acid analysis to determine the need for gastric acid supplementation, a practical method of determination is often used. If an individual is experiencing any signs and symptoms of gastric acid insufficiency as listed or has any of the diseases listed, the method outlined below can be employed.

### Protocol for hydrochloric acid supplements

1. Begin by taking one tablet or capsule containing 10 grains (600 mg) of hydrochloric acid at your next large meal. If this does not aggravate your symptoms, at every meal after that of the same size take one more tablet

### Diseases Associated with Low Gastric Acidity

- Addison's disease
- Asthma
- Celiac disease
- Dermatitis herpetiformis
- Diabetes mellitus
- Eczema
- Gallbladder disease
- Graves disease
- Chronic autoimmune disorders
- Hepatitis
- Chronic hives
- Lupus erythematosus
- Myasthenia gravis
- Osteoporosis
- Pernicious anemia
- Psoriasis
- Rheumatoid arthritis
- Rosacea
- Sjogren's syndrome
- Thyrotoxicosis
- Hyper- and hypothyroidism
- Vitiligo

or capsule. (One at the next meal, two at the meal after that, then three at the next meal.)

2. Continue to increase the dose until you reach seven tablets or when you feel a warmth in your stomach, whichever occurs first. A feeling of warmth in the stomach means that you have taken too many tablets for that meal, and you need to take one less tablet for that meal size. It is a good idea to try the larger dose again at another meal to make sure that it was the HCl that caused the warmth and not something else.
3. After you have found that the largest dose that you can take at your large meals without feeling any warmth, maintain that dose at all meals of similar size. You will need to take less at smaller meals.
4. When taking a number of tablets or capsules it is best to take them throughout the meal.

### Common Signs and Symptoms of Low Gastric Acidity

- Bloating, belching, burning, and flatulence immediately after meals
- A sense of fullness after eating
- Indigestion, diarrhea or constipation
- Multiple food allergies
- Nausea after taking supplements
- Itching around the rectum
- Weak, peeling and cracked fingernails
- Dilated blood vessels in the cheeks and nose
- Acne
- Iron deficiency
- Chronic intestinal parasites or abnormal flora
- Undigested food in stool
- Chronic candida infections
- Upper digestive tract gassiness



5. As your stomach begins to regain the ability to produce the amount of HCl needed to properly digest your food, you will notice the warm feeling again and will have to cut down the dose level.

### What causes hypochlorhydria

Like peptic ulcer disease, achlorhydria and hypochlorhydria have been linked to the overgrowth of the bacteria *Helicobacter pylori*. It has been shown that 90% to 100% of patients with duodenal ulcers, 70% with gastric ulcers, and about 50% of people over the age of 50 test positive for *H. pylori*.<sup>30</sup> Low gastric output is thought to predispose to *H. pylori* colonization and *H. pylori* colonization increases gastric pH, thereby setting up a positive feedback scenario and increasing the likelihood for the colonization of the stomach and duodenum with other organisms.<sup>31</sup> Interestingly, there has been only scant research into the effects of antacids and H<sub>2</sub>-receptor antagonists on promoting *H. pylori* overgrowth.<sup>32</sup>

If *H. pylori* gastritis leads to achlorhydria, the next obvious question is what are the factors that lead to *H. pylori* gastritis? Consistent with history, conventional medicine is obsessed with the infective agent rather than host defense factors. This obsession really began with Louis Pasteur, the 19th century physician and researcher who discovered the antibiotic effects of penicillin. Pasteur played a major role in the development of the germ theory. This theory holds that different diseases are caused by different infectious organisms. Much of Pasteur's life was dedicated to finding substances which would kill the infecting organisms. Pasteur and others since him who pioneered effective treatments of infectious diseases have given us a great deal for which we all should be thankful. However, there is more to the equation of the virility of the organism.

Another 19th century French scientist, Claude Bernard, also made major contributions to medical understanding. Only Bernard had a different view of health and disease. Bernard believed that the state of a person's internal environment or "milieu interieur" was more important in determining disease than the organism or pathogen itself. In other words, Bernard believed that the internal "terrain" or host susceptibility to infection was more important than the germ. Physicians, he believed, should focus more of their attention on making this internal terrain a very inhospitable place for disease to flourish.

Bernard's theory led to some rather interesting studies. In fact, a firm advocate of the germ theory would find some of these studies to be absolutely crazy. One of the most interesting studies was conducted by a Russian scientist named Elie Metchnikoff, the discoverer of the white blood cell. He and his research associates consumed cultures containing millions of cholera bacteria. Yet none of them developed cholera. The reason: Their immune systems were not compromised. Metchnikoff believed, like Bernard, that the correct way to deal with infectious disease was to focus on enhancing the body's own defenses.

During the last part of their lives, Pasteur and Bernard engaged in scientific discussions on the virtues of the germ theory and Bernard's perspective on the internal terrain. On his deathbed, Pasteur said: "Bernard was right. The pathogen is nothing. The terrain is everything."

Unfortunately, Pasteur's legacy is the obsession with the pathogen and modern medicine has largely forgotten the importance of the "terrain." So, what are the factors that predispose to *H. pylori* overgrowth? Well, because research focuses on eradicating the organism there is little information on protective factors against infectivity. Proposed protective factors against

*H. pylori* induced intestinal damage are maintaining a low pH and insuring adequate antioxidant defense mechanisms.<sup>33-35</sup> Low levels of vitamin C and E and other antioxidant factors in the gastric juice not only appear to lead to the progression of *H. pylori* colonization, but since the mechanism by which *H. pylori* damages the stomach and intestinal mucosa is via oxidative damage, it also contributes to the ulcer-causing potential of *H. pylori*.<sup>36</sup> Furthermore, antioxidant status and gastric acid output appears to be the answer to the question as to why everyone infected with *H. pylori* does not get peptic ulcer disease or gastric cancer.

As for how to eradicate the organism as well as stimulate increased host defense factors, I recommend deglycyrrhizinated licorice (DGL). DGL has shown good results in healing both duodenal ulcers and gastric ulcers. Rather than inhibit the release of acid, DGL stimulates the normal defense mechanisms that prevent ulcer formation. Specifically, DGL improves both the quality and quantity of the protective substances which line the intestinal tract; increases the lifespan of the intestinal cell; and improves blood supply to the intestinal lining.<sup>37,38</sup> Numerous clinical studies over the years have found DGL to be an effective anti-ulcer compound. In several head to head comparison studies, DGL has been shown to be more effective than either Tagamet, Zantac, or antacids in both short term treatment and maintenance therapy of peptic ulcers.<sup>39-42</sup>

The active components of DGL are believed to be special flavonoid derivatives. These compounds have demonstrated impressive protection against chemically-induced ulcer formation in animal studies. A common question related to DGL is "Does DGL have any effect on *Helicobacter pylori*?" The

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answer appears to be yes. In a recent study, several flavonoids were shown to inhibit *H. pylori* in a clear-cut concentration-dependent manner.<sup>43</sup> In addition, unlike antibiotics, the flavonoids were also shown to augment natural defense factors which prevent ulcer formation. The activity of flavone, the most potent flavonoid in the study, was shown to be similar to that of bismuth subcitrate.

In order to be effective in healing peptic ulcers, it appears that DGL must mix with saliva. DGL may promote the release of salivary compounds which stimulate the growth and regeneration of stomach and intestinal cells. DGL in capsule form has not been shown to be effective.

The standard dosage for DGL is two to four 380 mg chewable tablets between or 20 minutes before meals. Taking DGL after meals is associated with poor results.<sup>44</sup> DGL should be continued for eight to 16 weeks, depending on the response.

### **Pancreatic enzymes as digestive aids**

Each day the pancreas secretes about 1.5 quarts of pancreatic juice in the small intestine. Enzymes secreted include lipases which digest fat, proteases which digest proteins, and amylases which digest starch molecules. While starch and fat digestion can be carried out satisfactorily without the help of pancreatic enzymes, the proteases are critical to proper protein digestion. Incomplete digestion of proteins creates a number of problems for the body including the development of allergies and formation of toxic substances produced during putrefaction. Putrefaction refers to the breakdown of protein material by bacteria.

As well as being necessary for protein digestion, the proteases serve several other important functions. For example, the proteases, as well as other digestive secretions, are largely

responsible for keeping the small intestine free from parasites (including bacteria, yeast, protozoa, and intestinal worms).<sup>45</sup> A lack of proteases or other digestive secretions greatly increases an individual's risk of having an intestinal infection, including an overgrowth of the yeast *Candida albicans*.

Nutrition-oriented physicians use both physical symptoms and laboratory tests to assess pancreatic function. Common symptoms of pancreatic insufficiency include abdominal bloating and discomfort, gas, indigestion, and the passing of undigested food in the stool. For laboratory diagnosis, most nutrition-oriented physicians use the comprehensive stool and digestive analysis. This comprehensive analysis will usually reveal the level of pancreatic enzymes being dumped into the intestines from the pancreas by determining the level of excess fat in the stool, excess nitrogen in the stool, and the presence of any other partially or completely undigested food elements. In addition, the complete stool and digestive analysis will also reveal the health of the bacteria flora which often reflects the degree of pancreatic function.

The treatment of pancreatic insufficiency involves preparations from fresh hog pancreas. The United States Pharmacopoeia (USP) has set strict definition for level of activity. A 1X pancreatic enzyme (pancreatin) product has in each milligram not less than 25 USP units of amylase activity, not less than 2.0 USP units of lipase activity, and not less than 25 USP units for protease activity. Pancreatin of higher potency is given a whole number multiple indicating its strength. For example, a full-strength undiluted pancreatic extract that is ten times stronger than the USP standard would be referred to as 10X USP. Full-strength products are preferred to lower potency pancreatin products because lower potency products are often diluted with salt, lactose, or galactose to achieve desired strength (e.g., 4X or 1X). The dosage recommendation for a 10X

USP pancreatic enzyme product would be 500 to 1,000 mg three times a day immediately before meals when used as a digestive aid and 10 to 20 minutes before meals or on an empty stomach when anti-inflammatory effects are desired.

Enzyme products are often enteric-coated, that is they are often coated to prevent digestion in the stomach, so that the enzymes will be liberated in the small intestine. However, non-enteric-coated enzyme preparations actually outperform enteric-coated products if they are given prior to a meal (for digestive purposes) or on an empty stomach (for anti-inflammatory effects).

### **Final comments**

Proper digestion is a requirement for optimum health, and incomplete or disordered digestion can be a major contributor to the development of many diseases. The problem is not only that ingestion of foods and nutritional substances are of little benefit when breakdown and assimilation are inadequate, but also that incompletely digested food molecules can be inappropriately absorbed into the body. This problem can lead to various diseases and the development of food allergies.

Although antacids and H<sub>2</sub>-receptor antagonists may lead to relief of symptoms attributed to indigestion, they actually interfere with the digestive process and disrupt gut microbial ecology. A better approach may be to enhance digestion with the help of digestive aids like hydrochloric acid, pancreatin, and enzyme preparations.

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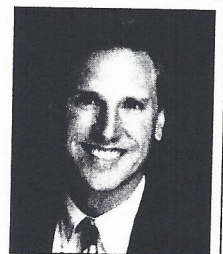
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