Gastoesophageal reflux disease (GERD) is the most common upper gastrointestinal problem seen in adults. Although the elderly have fewer complaints of heartburn, their disease is usually more severe and has more esophageal and extraesophageal complications. Tests for the evaluation of GERD in the elderly are the same as for the general population. Treatment of GERD in the elderly is the same as for the adult population. However, a more aggressive approach is warranted, because of the higher incidence of complications in the elderly.

INTRODUCTION
Gastoesophageal reflux disease (GERD) is the most common upper gastrointestinal problem seen in adults. It is estimated that 10%–20% of adults have symptoms at least once weekly and 15%–40% have symptoms at least once monthly (1). Although studies report a tendency to reduced heartburn and acid regurgitation symptom frequency in older populations, several studies show that the frequency of GERD complications, such as esophagitis, esophageal stricture, Barrett’s esophagus, and esophageal cancer is significantly higher in the elderly. Collen, et al (2) found an increase of esophagitis and Barrett’s esophagus in patients over 60 years of age compared to those younger, 81% versus 47%. Also, Huang, et al (3) found in elderly patients, as compared with younger patients, more severe gastroesophageal reflux and esophageal lesions.

PATHOGENESIS
A number of abnormalities that appear to play a pathogenic role in GERD are often more serious in the elderly. These include a defective anti-reflux barrier, abnormal esophageal clearance, reduced salivary production, altered esophageal mucosal resistance, and delayed gastric emptying. Injury to the esophagus is due primarily to gastric acid and pepsin. In some cases, duodenogastric reflux of bile may cause the injury (4). Also, nocturnal gastoesophageal reflux is associated with more severe manifestations and esophageal and extraesophageal com-
Complications of GERD (5–7). The lower esophageal sphincter (LES) is the antireflux barrier. Abnormalities that make it dysfunctional promote acid reflux and the constellation of GERD problems. The most common cause of reflux episodes is transient LES relaxations, the drop in LES pressure not accompanied by swallowing. Incompetence of the LES was shown by Huang, et al to be more prevalent in the elderly. Multiple medications that are taken by the elderly are well known to decrease LES pressure, such as those for hypertension, cardiovascular disease, and pulmonary disease. These include nitrates, calcium channel blockers, benzodiazepines, anticholinergics, and antidepressants. The presence of a hiatal hernia impairs the function of the LES and may impair the clearance of refluxed acid from the distal esophagus. The frequency of a hiatal hernia appears to increase with age (3).

Esophageal acid clearance can be impaired in the elderly due to disturbances of esophageal motility and saliva production. In elderly patients, there is a significant decrease in the amplitude of peristaltic contraction and an increase in the frequency of nonpropulsive and repetitive contractions compared to younger individuals (8). Salivary production is slightly decreased with age, with a significantly decreased salivary bicarbonate response to acid perfusion of the esophagus (9). Many medications taken by elderly patients for comorbidities can affect esophageal motility as well as the LES. Also, many diseases that affect motility, such as Parkinson’s disease, cerebrovascular disease, and diabetes mellitus, appear with greater frequency with advancing age.

The role of delayed gastric emptying and duodenogastric reflux in elderly patients with GERD is uncertain. However, medications used in disease states more commonly seen in the elderly may make these factors more important in the aging population. Medications taken with greater frequency by the elderly, such as nonsteroidal anti-inflammatory drugs (NSAIDs), potassium tablets and biphosphonates also directly injure the esophageal mucosa. Gastric acid secretion does not decrease with age alone. However, factors that lead to atrophic gastritis, such as Helicobacter pylori, reduce gastric acid (10). Such factors in association with the age-related decrease in esophageal pain perception may explain the phenomenon of reduced heartburn symptom severity as patients grow older. The feeling of reduced pain may in fact be a factor in the increased rate of GERD complications in the elderly, because acid injury can be more advanced without the usual warning symptoms (11).

CLINICAL PRESENTATION

The most common symptoms of GERD are heartburn and acid regurgitation (4). Other common symptoms are water brash, belching, and nausea. Generally, these symptoms do not change with age, except for heartburn. Heartburn is characterized by epigastric and retrosternal burning pain that may radiate to the neck, throat, and back. It can occur after large meals, exercise, or reclining. Remarkably, the frequency of severe heartburn seems to decline with age, possibly due to a decrease in esophageal pain perception and atrophic gastritis. Dysphagia, difficulty in swallowing, is an important symptom that is increased in the older patient. It may be related to several disease states more common in the elderly, such as Parkinson’s disease, cerebrovascular disease, and diabetes. In patients with GERD, it usually occurs in the setting of longstanding GERD and is progressive to solids and, when severe, even to liquids. It portends a more severe problem, such as severe peristaltic dysfunction, peptic stricture, or cancer.

Extrasesophageal symptoms are more common in the elderly. They include atypical chest pain that can simulate angina; ear, nose, and throat (ENT) manifestations such as globus sensation, laryngitis, and dental problems; and pulmonary problems such as chronic cough, asthma, and pulmonary aspiration (12).

COMPLICATIONS

Complications of GERD are common in the elderly. Up to 20% of patients seeking medical care for GERD in the United States have complications. Severe illnesses can result from GERD. These disease states may be esophageal or extraesophageal in nature. Nocturnal gastroesophageal reflux is associated with more severe manifestations (5–7). They may vary from minor problems of mild esophagitis to major problems such as recurrent pulmonary aspiration, Barrett’s esophagus, and esophageal cancer (Table 1) (13).
GERD in the Elderly

A SPECIAL ARTICLE

(continued from page 54)

Table 1. Complications of Gastroesophageal Reflux Disease

<table>
<thead>
<tr>
<th>Esophageal</th>
<th>Extraesophageal</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Esophagitis</td>
<td>• Noncardiac chest pain</td>
</tr>
<tr>
<td>• Esophageal stricture</td>
<td>• ENT complications*</td>
</tr>
<tr>
<td>• Barrett’s esophagus</td>
<td>– Globus sensation</td>
</tr>
<tr>
<td>• Esophageal cancer</td>
<td>– Hoarseness/laryngitis</td>
</tr>
<tr>
<td></td>
<td>– Laryngeal cancer</td>
</tr>
<tr>
<td></td>
<td>– Dental erosions</td>
</tr>
<tr>
<td></td>
<td>• Pulmonary complications</td>
</tr>
<tr>
<td></td>
<td>– Chronic cough</td>
</tr>
<tr>
<td></td>
<td>– Asthma</td>
</tr>
<tr>
<td></td>
<td>– Chronic bronchitis</td>
</tr>
<tr>
<td></td>
<td>– Pulmonary fibrosis</td>
</tr>
<tr>
<td></td>
<td>– Aspiration pneumonia</td>
</tr>
</tbody>
</table>

*ENT = ear, nose, and throat.

Esophageal Complications

The most common type of complication of GERD is esophagitis. It may progress to severe ulceration and severe hemorrhage (12). Esophageal stricture occurs in up to 10% of patients who have reflux esophagitis, especially in elderly men. Often, esophageal strictures are associated with the use of NSAIDs. Treatment usually consists of esophageal dilatation and aggressive antireflux therapy.

An important and increasingly more common esophageal complication is Barrett’s esophagus, in which columnar epithelium replaces squamous epithelium in the distal esophagus. It occurs in approximately 10%–15% of patients with GERD symptoms who undergo endoscopic examinations. It is more common in elderly white men over the age of 60. Although its pathogenesis is uncertain, GERD appears to injure the squamous epithelium and promote epithelial repair by columnar metaplasia of the esophageal mucosa. The current treatment is similar to that for routine GERD (14). Barrett’s esophagus is a premalignant condition highly associated with the development of adenocarcinoma of the esophagus and the gastric cardia. Endoscopy should therefore be considered in all elderly patients with chronic reflux symptoms. Adenocarcinoma of the esophagus is now the most common form of esophageal cancer and is among the fastest growing carcinomas by incidence in the United States (6). The incidence of adenocarcinoma in patients with Barrett’s esophagus is approximately 1% per year. These patients typically present in the seventh or eighth decade of life with weight loss and dysphagia. Patients with Barrett’s esophagus must be evaluated with upper gastrointestinal (GI) endoscopy and biopsy for the presence of dysplasia, which is a precursor of invasive cancer. Continued surveillance and aggressive measures in high-grade dysplasia are warranted and include endoscopic ablative techniques such as electrocautery fulguration, laser photocoagulation, and photodynamic therapy, and even esophagectomy. Although the overall survival rate of patients with adenocarcinoma of the esophagus is less than 10%, those with cancer identified in surveillance programs usually have higher survival rates (15).

Extraesophageal Manifestations

Extraesophageal manifestations of GERD are more common in the elderly (16). Atypical noncardiac chest pain from GERD may often be indistinguishable from angina. Atypical chest pain has been related to GERD in up to 60% of cases, with 50% being related directly to reflux injury and 10% related to esophageal motility. Ear, nose, and throat manifestations of GERD, such as globus sensation and laryngitis, are more frequent in the elderly. In up to 10% of patients with hoarseness, acid peptic injury from reflux is the cause. Prolonged antireflux therapy may be necessary and is effective in these patients. However, prompt relapses do occur when therapy is discontinued. Acid injury promotes the development of laryngeal polyps and cancer, and possibly dental problems such as dental erosions, which are noted with increasing frequency in patients with GERD. Pulmonary problems associated with GERD, such as asthma, chronic bronchitis, pulmonary fibrosis, and aspiration pneumonia, are seen more frequently in the elderly. Remarkably, chronic cough can be the only symptom of GERD in some patients. In up to 21% of
patients with chronic cough, GERD is implicated as the cause, and antireflux therapy is often helpful. The mechanisms involved in the development of these problems are neurally mediated reflex bronchoconstriction due to esophageal irritation by acid and pulmonary aspiration of refluxed material (15).

EVALUATION

Several diagnostic tests are available for the evaluation of GERD. Barium swallow and upper GI endoscopy are used to evaluate dysphagia and mucosal injury. In patients with atypical symptoms or when quantitation of reflux is required, ambulatory pH monitoring is helpful. Esophageal manometry is often used in patients with markedly atypical symptoms, for locating the LES for pH testing, and in those for whom surgery is contemplated. It is not useful for evaluation in the majority of patients. Newer tests are now available (17). The proton pump inhibitor (PPI) test has evolved to become one of the most useful noninvasive tests in GERD patients. Patients are given a course of high dose PPI agent, such as omeprazole 60 mg per day for 7 days, and observed for improvement in their clinical response (18). Multichannel intraluminal impedance with pH sensor allows the detection of pH episodes irrespective of their pH values (acid and nonacid reflux). It is useful in the postprandial period and in patients with persistent symptoms while on therapy and those with atypical symptoms. Diagnostic tests should be performed in patients in whom the diagnosis remains uncertain; inpatients with atypical symptoms such as chest pain, ENT problems, or pulmonary complications; and in patients with symptoms associated with complications such as dysphagia, odynophagia, unexplained weight loss, GI hemorrhage, and anemia (16). Tests should also be performed in patients prior to consideration of antireflux surgery and in patients who have an inadequate response to therapy, whether medical or surgical, or who have recurrent symptoms. In contrast to younger patients, endoscopy should be considered earlier as the initial diagnostic test in elderly patients with heartburn regardless of the severity or duration of complaints. This aggressive approach may be warranted because of the higher incidence of cumulative acid injury over years and the higher incidence of complications of Barrett’s esophagus and esophageal cancer in the elderly (2).

TREATMENT

Although treatment of GERD in the elderly is essentially the same as in all adults, a more aggressive approach to treatment may often be necessary in this group because of the higher incidence of complications. The treatment goals for GERD include elimination of symptoms, healing of esophagitis, managing or preventing complications, and maintaining remission (19). The vast majority of patients can be treated successfully with the noninvasive methods of lifestyle modification and medication (Table II).

Although lifestyle modification remains a cornerstone of therapy in GERD, it may not be sufficient to control symptoms in the majority of patients, especially in those with complications.

Patients should try to elevate the head of their beds before going to sleep, avoid eating within three hours of bedtime, stop smoking tobacco, and change their diet to

---

**Table 2. Noninvasive Treatment of Gastroesophageal Reflux Disease***

*Lifestyle Modification*
- Elevation of head of bed
- Avoid eating within 3 hours of bedtime
- Avoid tobacco, alcohol, caffeine, fatty food, peppermint
- Avoid harmful medications if possible, such as NSAIDs, beta blockers, calcium-channel blockers, theophylline, potassium tablets, bisphosphonate

*Medications*
- Antacids
- Motility agents: metoclopramide, erythromycin, bethanecol, cisapride
- H₂-receptor antagonists: cimetidine, famotidine, nizatidine, ranitidine
- PPI agents: esomeprazole, lansoprazole, omeprazole, pantoprazole, rabeprazole

NSAIDs = nonsteroidal anti-inflammatory drugs: 
H₂ = histamine₂; PPI = proton pump inhibitor.
*Most often successful.

---
decrease fat and volume of meals and to avoid dietary irritants such as alcohol, peppermint, onion, citrus juice, coffee, and tomatoes. Potentially harmful medications, such as NSAIDs, potassium tablets, bisphosphonates, beta blockers, Theophylline and calcium-channel blockers should be avoided, if possible. If these agents must be continued, the regimen should be modified on an individual basis. Often, it may not be possible to avoid these medications due to comorbid conditions in the elderly.

Over-the-counter antacids and histamine \(_2\) (H\(_2\)) blockers on an as-needed basis may be helpful for those individuals who have mild disease. However, for the majority of patients, and certainly for those patients with complications, one must use prescription agents for more effective therapy, at least until symptoms are initially controlled.

Motility agents, such as cisapride, metoclopramide, erythromycin, and bethanechol, have helped some in improving LES tone and esophagogastric motility in select patients. In patients with severe disease, their success is limited. For patients with diabetes, cisapride and metoclopramide have been used with moderate success in improving gastric emptying and reducing GERD symptoms. However, cisapride is only available on a compassionate-use basis due to potentially fatal cardiac arrhythmias. Metoclopramide must be used with caution in the elderly because it can cause side effects, such as muscle tremors, spasms, agitation, insomnia, drowsiness, and tardive dyskinesia, in up to one-third of patients.

Histamine \(_2\)-receptor antagonists, including cimetidine, ranitidine, famotidine, and nizatidine, are very helpful in patients with GERD, by providing good acid suppression and symptom relief. They are remarkably similar in their action and equally effective at equivalent doses. However, high doses of up to four times daily may be necessary in some patients. Although they are safe agents in the elderly, reduced doses in renal insufficiency, which is more common in the elderly, are necessary. Also, all may contribute to the development of delirium in this age group. Drug-drug interactions, especially with cimetidine, may be potentially harmful in elderly patients who often use medications (eg, warfarin, phenytoin, benzodiazepines, and Theophylline) that can be affected by metabolism of the hepatic cytochrome P-450 system. Side effects of these agents, especially cimetidine, are more common in the elderly.

Central nervous system side effects, such as mental confusion, delirium, headache, and dizziness are more common in the elderly. Antiandrogen side effects of gynecomastia and impotency, cardiac side effects of sinus bradycardia, atrioventricular block, and prolongation of the QT interval, and hematologic side effects of anemia, neutropenia, and thrombocytopenia have increased frequency in the elderly, especially with comorbid conditions. However, most side effects are reversible with dosage reduction or withdrawal of the drug.

Proton pump inhibitors (PPIs), such as esomeprazole, lansoprazole, omeprazole, pantoprazole, and rabeprazole, constitute the most effective therapy for GERD. Proton pump inhibitors provide excellent acid suppression and effective symptom relief. These agents are particularly useful in elderly persons who often require more acid suppression due to more severe disease or complications. In older patients who are unable to swallow pills, capsules may be opened and the granules mixed in water or juice or sprinkled on applesauce or yogurt.

Lansoprazole is also available as an orally dissolving tablet and an oral suspension, which may be useful for those with swallowing disorders or those who are on tube feedings. Relapses are common in patients with GERD, especially in the elderly. Maintenance therapy is important. Long-term treatment with adequate doses of medication is the key to effective care in the elderly. For the majority of patients with peptic esophageal strictures, the use of acid suppression and esophageal dilatation are effective therapy. Aggressive acid suppression is effective in the majority of patients with GERD-related chest pain. Ear, nose, and throat problems, such as hoarseness, have dramatic responses to use of these agents when used for prolonged periods. In patients with GERD-mediated asthma, significant improvement with acid suppression by H\(_2\) blockers and PPIs will occur. Maintenance therapy is required in all of these patients because relapses occur very soon after cessation of therapy. In patients with Barrett’s esophagus, chronic medical therapy is warranted, although its success remains controversial (11). Although profound acid suppression by PPIs may potentially affect such factors as B\(_{12}\) absorption and bacterial proliferation, clinical relevance remains uncertain. Therefore, long term maintenance with PPIs is safe (20).
GERD in the Elderly

Although the vast majority of patients can be successfully managed with medical therapy, invasive methods of surgery and endoscopic treatment of GERD may be warranted. Surgery is an option for some patients with GERD (21). Surgery is contemplated now with more frequency because of the ability to perform antireflux surgery laparoscopically. It is indicated in patients with intractable GERD, difficult-to-manage strictures, severe bleeding, nonhealing ulcers, recurrent aspiration, and GERD requiring large maintenance doses of PPIs or H₂-receptor antagonists. Barrett’s esophagus alone is not an indication for surgery. Given that there appears to be no more increase in postoperative morbidity or mortality in the elderly with this type of surgery, healthy elderly patients should not be denied surgery on the basis of age alone (22). Careful patient selection with complete preoperative evaluation, including upper GI endoscopy, esophageal manometry, pH testing, and gastric emptying studies, should be done prior to surgery.

Endoscopic therapy of GERD is evolving. Implantation of Enteryx, a biocompatible, non-biodegradable polymer into the gastric cardia, appears to be effective for treatment of GERD (23). Radiofrequency energy delivery to the gastroesophageal junction, the Stretta Procedure, has been effective in reducing symptoms of GERD (24). In addition, endoscopically suturing below the gastroesophageal junction is possible and has been used successfully to treat GERD (25). Further investigation and perfection of these techniques is warranted.

CONCLUSION

Gastroesophageal reflux disease is a very common condition in the elderly. Although elderly patients have fewer complaints of heartburn, their disease is usually more severe and has more complications. With appropriate management, GERD can be treated successfully in most elderly patients.

References