The aging oesophagus

Introduction
Diagnosing and treating gastrointestinal disorders in elderly patients requires that the physician be acquainted with both psychological and physical alterations induced by aging. Diseases of the oesophagus in elderly patients may be associated with the classic complaints of dysphagia, regurgitation, chest pain, and heartburn. However, atypical presentations are more common in this age group, and there is a greater likelihood of concurrent disease that may confound the interpretation of symptoms. Elderly patients are also more susceptible to complications that may accompany inadequately treated or long-standing oesophageal disease, such as aspiration, malnutrition or Barrett’s adenocarcinoma.

Oesophageal function and aging
Oesophageal function in elderly patients has been studied in several cross-sectional studies. Only one prospective study on the effect of aging on oesophageal function was reported, in a rather young group of healthy volunteers. Early literature suggested a rather common degeneration of oesophageal function with aging. The term presbyoesophagus was proposed to describe an age related decrease in contractile amplitude, polyphasic waves in the oesophageal body, incomplete sphincter relaxation, and oesophageal dilatation. This notion has been abandoned in asymptomatic subjects have yielded conflicting results. In the absence of atrophic gastritis, acid peristalsis, a major clearance mechanism for refluxed acid, is evoked less frequently and less consistently. Hence, an increased incidence of gastro-oesophageal reflux with age does not seem unlikely. However, several studies failed to show a significant difference in the duration or frequency of reflux episodes with increasing age. Smout et al demonstrated significantly increasing oesophageal acid exposure and longer duration of reflux episodes with age. Richter et al also observed that subjects over 50 years of age had more long-lasting reflux episodes, but this did not result in significantly higher acid exposure.

Overall, except for the decreased likelihood of a peristaltic response to wet swallows, the age related changes in oesophageal physiology seem to be mild or minimal. Neuromuscular degeneration may account for some of the observed differences. However, the thickness of oesophageal smooth muscle does not vary between young and old subjects. In the human oesophagus, the number of myenteric neurones in the oesophagus decreases with age. Conceivably, partial denervation might contribute to disordered peristalsis, but the precise relation between the reduction in the number of myenteric neurones and the frequency of oesophageal motor dysfunction in elderly patients remains to be explored.

Dysphagia in the elderly
Dysphagia is a very common complaint in the elderly. Up to 10% of people over the age of 50 report troublesome dysphagia, although the majority do not consult a physician for these symptoms. In older people, dysphagia is also correlated with important morbidity and even mortality: nursing home patients with dysphagia have significantly higher six-month mortality than those without. In patients with oropharyngeal dysphagia and associated aspiration, increased morbidity and mortality have been found.

Dysphagia can result from a variety of defects affecting either the oropharynx (swallowing disorders) or the oesophagus. Clinical history, observing the patient swallow and endoscopic and/or radiographic examination allow one to differentiate between oropharyngeal and oesophageal causes of dysphagia, and to distinguish structural or functional underlying disease (table 1). Most elderly patients have functional type dysphagia.

The reason for the high rate of dysphagia in the elderly is unclear, as studies in asymptomatic individuals have only been able to show minimal age related changes. Swallowing disorders, characterised by the inability to transfer food from the mouth to the upper oesophagus, are common in the elderly. Most of these patients have a functional abnormality of the oral or the pharyngeal stage of swallowing, which can be identified on video fluoroscopy. One study reported that, even in elderly patients without dysphagia, video fluoroscopy shows abnormalities in up to 63%. Therefore, it seems likely that swallowing disorders are often undiagnosed and untreated in the elderly. Swallowing disorders are most commonly seen in patients with cognitive–perceptive changes or neurological deficits (table 1). In these patients, disordered swallowing is often only one manifestation of a multi-faceted disease process. In a number of swallowing disorders, the underlying cause can be treated—for example, Parkinson’s disease. In others, rehabilitation techniques are
Patients with documented obstruction caused by that necessitating the use of feeding gastrostomy or jejunostomy. Elderly patients have permanently impaired swallowing, to food in the mouth. Unfortunately, a substantial group of patients with oesophageal hypomotility also show an increased incidence of disorders associated with impaired oesophageal motility, such as achalasia or diaphragmatic dysfunction. Whether this aperistaltic condition responds to treatment with effective symptom relief in older patients with reflux disease. Older patients seem to need higher levels of acid suppression to heal oesophagitis and to relieve symptoms, than younger patients. It is unclear whether the same applies to GORD in the elderly, or whether other mechanisms play a major role in this population. Furthermore, in many older people, as a result of concurrent disease and medication, decreases in salivary flow, gastric acid production, oesophageal motility, gastric emptying, and LOS tone may be present.

In a subset of elderly patients with functional oesophageal disease, primary oesophageal motility disorders such as achalasia or diffuse oesophageal spasm are readily identified. Elderly patients with achalasia respond poorly to medical therapy, but they respond well to pneumatic dilatation. Botulinum toxin injections into the LOS provide effective symptom relief in older patients with achalasia. The need for this intervention in elderly patients with oesophagitis do not have typical reflux symptoms. In view of these findings, it seems likely that reflux disease in the elderly is often undiagnosed and untreated, especially as an underlying cause of pulmonary symptoms.

As oesophageal function is relatively well preserved with age in healthy subjects, an explanation for the increased incidence of GORD in the elderly is unclear. Prolonged stationary and ambulatory LOS sleeve manometric studies have demonstrated that transient LOS relaxations are the main mechanism underlying reflux episodes in healthy subjects and in patients with reflux disease. It is unclear whether the same applies to GORD in the elderly, or whether other mechanisms play a major role in this population. Furthermore, in many older people, as a result of concurrent disease and medication, decreases in salivary flow, gastric acid production, oesophageal motility, gastric emptying, and LOS tone may be present. The role of concurrent disease and medication in GORD in the elderly has yet to be studied.

State-of-the-art pH monitoring studies failed to show increased acid exposure in the elderly. As the presence of atrophic gastritis and achlorhydria increases with age, a higher prevalence of non- or less acidic reflux in the elderly seems likely. This hypothesis might not only explain the lower prevalence of heartburn, but also the more severe mucosal disease found in elderly patients with reflux disease. Recent studies have highlighted the role of duodenogastro-oesophageal reflux in patients with higher grades of reflux oesophagitis. So far, no data are available on the role and prevalence of bile reflux in elderly healthy volunteers or in elderly patients with GORD. It is unclear whether decreased oesophageal tissue resistance in the elderly, as a result of impaired epithelial cell regeneration, also contributes to more severe mucosal disease.

Older patients seem to need higher levels of acid suppression to heal oesophagitis and to relieve symptoms, than younger patients. It is unclear whether the same holds true for maintenance treatment for reflux disease in the elderly. However, in view of the prevalence of pulmonary symptoms in elderly patients with reflux disease, they could respond more favourably to a treatment regimen that includes prokinetic agents. So far, no clinical studies have tackled this specific question in older patients.

**Oesophageal cancer in the elderly**

The main risk associated with long-standing GORD is adenocarcinoma arising from Barrett’s metaplasia. The prevalence of Barrett’s oesophagus increases with age, reaching a plateau by the seventh decade. The length of columnar epithelium does not seem to increase significantly with age. Over the past 20 years, the incidence of adenocarcinoma of the oesophagus and the gastric cardia has increased at a rate exceeding that of any other cancer. Barrett’s oesophagus (specialised columnar epithelium) is the only known risk factor for these malignancies, and its
incidence rises with age. Adult Caucasians frequently have unrecognised segments of specialised columnar epithelium at the gastro-oesophageal junction. It has been suggested that this underlies the rising frequency of cancer of the gastro-oesophageal junction, as adenocarcinomas located at the junction are associated with Barrett’s metaplasia in at least half of the patients. Thus, it seems likely that an increasing group of elderly patients with adenocarcinoma of the gastro-oesophageal junction will come to medical attention. Recent, successful endoscopic treatment of Barrett’s epithelium, with or without early malignant changes, has been reported. Larger scale prospective studies will be needed to confirm the successful application of these techniques in treating or preventing the development of malignancy in patients with Barrett’s metaplasia at the gastro-oesophageal junction. If effective, endoscopic ablation may provide an alternative to surgery for high-grade dysplasia or early adenocarcinoma in high-risk surgical resection. Palliative treatment using expandable stents, laser photocoagulation, photodynamic therapy, ethanol injection, or radiotherapy may provide relief of dysphagic symptoms. Trials comparing effectiveness, cost and patient preference of these different treatment modalities are needed.

Conclusion
Overall, the age related changes in oesophageal physiology seem to be mild or minimal. In contrast to these observations, dysphagia and GORD occur extremely frequently in elderly patients. It seems likely that swallowing disorders and GORD are often undiagnosed and untreated in geriatric patients. In many cases, the optimal mode of treatment in the elderly has not been established, or available treatment options are insufficient. The incidence of adenocarcinoma of the oesophagus and the gastric cardia, associated with long-standing GORD and Barrett’s oesophagus, has increased rapidly over the past 20 years. Endoscopic ablation may have the potential to provide an alternative to surgery for early stages of this type of tumour in high-risk surgical patients. In the meantime, a growing population of elderly patients with oesophageal cancer will need palliative treatment of dysphagic symptoms. Trials comparing effectiveness, cost and patient preference of different treatment modalities for palliative treatment of oesophageal malignancy are needed.