asthma attack and that their lack of evident discomfort prevents physicians and other caregivers from taking the attack seriously, allowing the airways obstruction to progress further than it would for a pink puffer.

These findings and these questions reemphasize the importance of making objective measurements of the severity of asthma, during and prior to attacks. Magadle and associates recommend determining POD, by measuring the dyspnea response to added external loads or to bronchoprovocation tests, in all asthmatics, allowing physicians to identify and focus scarce medical resources for monitoring and patient education in self-management on the subjects most at risk. Maybe so, but it seems that home peak flow monitoring and its correlation with symptom diaries would accomplish the same purpose more efficiently, inexpensively, and safely.

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Oropharyngeal Dysfunction in COPD Patients

The Need for Clinical Research

As chest physicians, we evaluate oropharyngeal function in patients in whom we suspect aspiration, including those with a history of stroke, Parkinson’s disease, motor neuron disease, myasthenia, myopathies and other central and peripheral nervous system diseases, and in patients with oropharyngeal structural abnormalities, selected systemic diseases, and recent endotracheal extubation. However, the association between pulmonary parenchymal diseases, including COPD, and oropharyngeal function has not been examined in a systematic manner. Swallowing is a complex physiologic process involving four consecutive phases (oral preparatory, oral voluntary, pharyngeal, and esophageal) utilizing > 30 muscles.1 The precise timing and coordination of swallowing is vital for bolus transfer into the esophagus and for airway protection. There is also an interdependence between respiration and swallowing that is under complex voluntary and involuntary control. In this issue of CHEST (see page 361), Mokhlesi et al hypothesize that patients with hyperinflation from COPD have altered oropharyngeal function, including a lower laryngeal resting position and a decrease in laryngeal elevation, potentially predisposing to aspiration. Utilizing videofluoroscopic techniques in 20 COPD patients and in 20 historical control subjects, the maximum laryngeal elevation during swallowing was significantly lower in the COPD patients. Patients with COPD also used spontaneous protective swallowing maneuvers more frequently than the historical control subjects. This preliminary study has design flaws, including the use of historical control subjects, and the potential presence of confounding variables. However, despite these flaws, the study does support the need for further research to determine whether COPD is associated with perturbed function of the oropharynx leading to episodes of aspiration. Whether these episodes have a role in COPD exacerbations and lung function decline remains to be determined.

What techniques are available to examine oropharyngeal function? The primary tool used by Mokhlesi

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and colleagues was a multidisciplinary team of experts, including radiologists, speech/language pathologists, gastroenterologists, and otolaryngologists. Although videofluoroscopy, as used in this study, is considered the “gold standard” for aspiration detection, it does not allow quantification of pharyngeal contractile forces, nor detection of incomplete upper-esophageal sphincter (UES) relaxation, or intrabolus pressure during swallowing. Pharyngeal and upper-esophageal manometry allows assessment of pharyngeal muscle contraction and UES relaxation, as well as the relative timing and coordination of the pharyngeal muscles and UES relaxation events. Using manometry with videofluoroscopy concurrently overcomes the weaknesses of the individual procedures when used separately, and allows integration of data, although accurate synchronization is very important. Nasoendoscopy can also be useful. The videoendoscope is inserted transnasally and positioned at the level of the soft palate to view the tongue base, epiglottis, and superior pharyngeal wall, and below the epiglottis to view the laryngeal vestibule. This technique can examine pharyngeal swallowing initiation and determine whether there is residue present after swallowing. Accumulated oropharyngeal secretions and dye staining of the subglottic airway are indirect signs of aspiration. Additionally, investigators have used air pulses to assess supraglottic and pharyngeal sensation. These techniques, as well as simultaneous monitoring of the onset of swallowing with a submental electromyogram (EMG) of the mylohyoid-geniohyoid muscle complex, and of chewing with an EMG of the masseter muscle, are also important. Evaluation of the temporal relationship of oropharyngeal swallowing to respiration and respiratory effort can be monitored by methods utilized in the evaluation of sleep-related breathing disorders, including oropharyngeal pressure, respiratory inductance plethysmography, and oronasal airflow.

So why should chest physicians be interested in investigating oropharyngeal function in patients with COPD from a research standpoint? First, identification and correction of factors that lead to pulmonary function deterioration and/or acute exacerbations of COPD may lead to improved outcomes in these patients. For instance, episodes of microaspiration may predispose to bronchoconstriction and/or the introduction of bacteria into the upper airway. Second, there is minimal data evaluating oropharyngeal function and swallowing disorders in COPD patients. Utilizing videofluoroscopy, Stein et al evaluated 25 patients with moderate-to-severe COPD with frequent exacerbations and found that 17 patients (84%) had marked dysphagia compared to 11% in a control group. Gastroesophageal reflux was also noted in 5 of 17 patients (29%) with severe cricopharyngeal dysfunction. However, confounding factors, including medications, sex, and age, may have played a role. The eight patients who underwent cricopharyngeal myotomy had improvement in their swallowing and complete or partial relief from COPD exacerbations. Third, the potential pathophysiologic mechanisms involved need further elucidation. Pulmonary overinflation and laryngeal elevation may have an impact on pharyngoesophageal anatomic structures in COPD patients. Fourth, there are minimal studies reported examining the acute and chronic effects of cigarette smoke on oropharyngeal function. Dua et al compared pharyngo-UES contractile reflexes and reflexive pharyngeal swallows in 10 healthy smokers and 10 healthy nonsmokers, and showed that smokers had an increased threshold volume required for the initiation of the pharyngo-UES contractile reflex. Active smoking resulted in a further increase of the threshold volume. Furthermore, COPD may have an impact on swallowing coordination with the phases of respiration. Shaker et al noted that young, healthy volunteers had preferential coupling of swallowing with the expiratory phase of respiration. This preferred coupling was altered during exacerbations in COPD patients. Furthermore, the role of gastroesophageal reflux and oropharyngeal dysfunction in patients with COPD has not been evaluated. In an animal model, repeated acid-pepsin instillations impaired laryngeal patency-maintaining mechanisms provided by laryngeal sensory feedback, further predisposing to laryngeal penetration and microaspiration. Gastroesophageal reflux may also result in shortening of the esophagus so that the UES is in the thoracic cavity, which may impair muscle contraction and influence the timing of the rapid pharyngeal phase. There is preliminary data examining this possibility. Tibbling examined the effect of fundoplication and diaphragmatic crural repair in 119 patients with hiatal hernia and gastroesophageal reflux, and examined respiratory outcome with a mean follow-up of 4.3 years. Thirty-four percent of patients reported cough prior to surgery, with improvement to 7% in the postoperative state. Furthermore, chronic bronchitis symptoms were present in 21% in the preoperative state compared to 4% in the postoperative state. These data, along with the preliminary data of Mokhlesi et al, should spark further investigation pursuing the role of oropharyngeal dysfunction in COPD patients.

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Waiting To Make the Weight for Lung Transplantation

Since lack of donor organs remains the limiting factor to the number of lung transplantation procedures that can be performed, lung transplant physicians and surgeons are struggling constantly to find a balance between those patients who most need this procedure and those who are likely to have outcomes following lung transplantation, this group suggested that extremes of ideal body weight < 70%

Extrapolating from data in studies from other areas of thoracic surgery, and particularly in the field of cardiac transplantation, one also would suspect that extremes of body weight may portend a worse outcome in the lung transplant recipient.1-3 Similar results also have been found in the kidney transplant recipient, with a demonstrated correlation between obesity and increased rates of cardiac disease, and decreased graft and patient survival.4,5 Little has been published on body weight in the field of lung transplantation, other than limited data examining outcomes in cachectic or nutritionally depleted patients who were undergoing lung transplantation. These data suggest that lung transplant recipients with body mass indexes (BMIs) [ie, weight in kilograms divided by the height in meters squared] lower than the 25th percentile, or < 80% of the predicted weight for a certain height, and/or those patients with lean body mass depletion have a worse survival rate following lung transplantation.6-8 Additionally, not all studies have reached these same conclusions.9 Until the publication of the article by Kanasky et al in this issue of CHEST (see page 401) and a recent publication by Madill et al,10 no studies had been conducted on the opposite extreme (ie, the evaluation of a morbidly obese patient for lung transplantation). Other problems that have been seen in the few studies on the extremes of body weight have been the variable definitions of obesity and the interchangeable use of measures of BMI and percentage of ideal body weight.

A decade ago, as newcomers to this field, a new possible transplant recipient would be presented (including information on height and weight) to our then-surgical director of the lung transplant program (and one of the pioneers in lung transplantation) Dr. J. Kent Trinkle. Often, it was a patient who, in the pulmonologists’ minds, was only moderately over-weight. After completing the presentation, Dr. Trinkle would respond, “the only problem with that patient is that he or she is several inches too short!” The article presented in this issue lends support to the surgical concerns about performing transplants in overweight patients. Further experiences in this field over the past decade, have reinforced the opinions of our surgical colleagues.

In 1997, a group of transplant physicians and surgeons representing multiple transplant-related organizations convened to establish guidelines for lung transplant recipients. Although few studies had clearly examined the impact of body weight on outcomes following lung transplantation, this group suggested that extremes of ideal body weight < 70%

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