Lung Volume Reduction

A Breath of Fresh Air?

The level of the present interest in surgery for patients with emphysema is extraordinary. After an earlier history which included such surgical misadventures as chest expansion procedures, phrenic nerve interruption, and placement of metal braces to stent larger airways, Otto Brantigan in the late 1950s and early 1960s identified an operative approach which was based on an accurate understanding of the pathophysiology of emphysema. He reasoned that resection or plication of what he called “localized, emphysematous areas” might improve pulmonary function in emphysema patients by one of several mechanisms. The two dominant principles which emerged as the foundation of the current interest are promotion of bronchial patency by restoration of normal elastic recoil properties and improvement in the chest wall, particularly diaphragm, functional configuration. This general approach is now called lung volume reduction and the specific operation is reduction pneumonoplastic.

Many groups are actively performing and investigating this surgical approach for patients with emphysema. The few published reports and many recent presentations at national meetings provide data regarding early results. These experiences are encouraging as 3- and 6-month follow-up shows improvement in exercise capacity and reduction in breathlessness. This symptom response correlates with improvement in some pulmonary function variables such as FEV1. Important issues, however, remain unsettled. The criteria for selection and/or rejection of patients are not yet fully established. The surgical technique of choice, open resection, thoracoscopic resection, thoracoscopic laser consolidation/plication, or some combination is being hotly debated. Which of the objective measures of pulmonary function correlate best with functional results is uncertain. Neither symptomatic nor functional late results are known. Is this a “quick fix” to be quickly overtaken by disease progression or is the benefit long-lasting and durable?

The article in this issue “Lung Volume Reduction in Patients with Severe Diffuse Emphysema” (see page 28) is the first publication to provide any insight into long-term results. Without fanfare, this group began to apply the principles and methodology of Brantigan prior to the present spate of interest. Although conclusions and inferences are limited by the small number of patients in their series and their decision to operate only on one lung via a unilateral thoracotomy, this experience clearly is relevant. The interesting observations include persistent symptomatic improvement up to 3 years after the operation, but a leveling off of

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actual pulmonary function variables, such as FEV₁, at 1 year with even a tendency for these parameters to return toward preoperative levels.

This report is both encouraging and cautionary. The encouragement is that in at least a small group of patients, a reduction pneumonoplasty can reduce symptoms of breathlessness and dyspnea and improve lifestyle for at least several years after the operation. On the other hand, the mechanism by which this result is achieved remains somewhat mysterious. If the observations of the French group are documented by other groups, patients are made to feel better but some objective measures of pulmonary function may return toward their baseline value after initial improvement. This may mean that we do not know which of the many measurements of pulmonary function are those that correlate with improvement and should be monitored. It will be extremely important as we obtain further long-term follow-up data from other groups that we document the extent to which subjective improvement is related to objective improvement of specific measures. My own personal experience with these patients convinces me that there is a genuine benefit from reduction pneumonoplasty but to improve and refine selection criteria, and maximize operative technique and perioperative care, clarification of the effect on measurable, quantifiable variables is essential.

It also must be recognized that there is considerable benefit from the focus of attention and supportive care, including intensive pulmonary rehabilitation, which is trained on these patients. It therefore follows that the ultimate challenge is to carry out a prospective, randomized comparison of intensive medical care with this operative procedure. In this fashion, we will not only come to understand the long-term results of reduction pneumonoplasty but also whether these results are genuinely superior to intensive but more conservative management.

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REFERENCE

Occupation and Asthma

Through a Glass, Darkly

In this issue of CHEST (see page 58), Reijula and collaborators document, by two distinct definitions, parallel trends of increasing asthma incidence. First, they define general asthma in the adult population applying fairly conservative criteria: certification by a pulmonary specialist and at least 6 months on prescribed asthma medication. Using this definition, they found dramatic increases in asthma from 1986 to 1993 in two age groups: 15 to 29 years and 30 to 49 years (up 67% overall). Interestingly, no such increase was observed in the 50- to 64-year-old age group (for men in this age group the incidence actually declined by 43%).

Increasing asthma incidence has been observed in a number of countries, including the United States, and has been a subject of considerable discussion. It should be noted, however, that in US data the major contributors to increased asthma appear to be the young and the old, with rates among adults of working age staying relatively stable.1,2 In that light, the second part of the analysis by Reijula et al is all the more intriguing. Using a measure equally as conservative as their general asthma definition, they studied temporal changes in the incidence of occupational asthma. They characterized occupational asthma by specialist diagnosis using preset criteria then reported to the Finnish Occupational Safety Administration. Over the same 8-year period, occupational asthma increased by 70% among both men and women. This finding amplifies previous reports from Finland indicating increasing occupational asthma from the early 1970s and 1980s.3,4

These data are particularly impressive because surveillance for work-related asthma is so challenging and the epidemiology of occupational asthma remains relatively underdeveloped.5 In the United States, occupational disease surveillance in general is severely handicapped. One US congressional report on the subject was pointedly titled “Occupational Illness Data Collection: Fragmented, Unreliable, and Seventy Years Behind Communicable Disease Surveillance.”6 The National Institute for Occupational Safety and Health (NIOSH) has attempted to address these shortcomings through a targeted surveillance program for asthma as part of its larger Sentinel Event Notification System for Occupational Risks (SENSOR) program.7 Although data from that program are limited, there has been at least an initial suggestion of an increase in occupational asthma incidence from 1989 to 1991.5 In contrast, National Health Interview Survey data have not indicated a rising prevalence of general asthma (1988 compared with 1983 to 1985) among those in the labor force overall, nor in any broadly defined occupa-