Lung-volume reduction surgery: A vanishing operation?

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The article by Lederer and colleagues¹ in this issue of the *Journal* reports on a small series of patients with end-stage emphysema undergoing lung-volume reduction surgery (LVRS) with good clinical results and amazingly low morbidity and mortality. The purpose of the article is to correlate improvements in clinical status with the body mass index, airflow obstruction, dyspnea, and exercise capacity (BODE) index, a multidimensional predictor of survival in patients with chronic obstructive pulmonary disease. The authors suggest that the BODE index may eventually prove useful as a surrogate to predict survival not only for patients with chronic obstructive pulmonary disease, but for those with end-stage emphysema undergoing LVRS. Their conclusions regarding the BODE index, however, must be regarded with caution because of a number of inherent limitations in their study. First, as the authors themselves point out, the study includes a small number of patients operated on at a single center with a relatively short follow-up.¹ Perhaps more importantly, however, the BODE index itself appears to have inherent limitations that could prevent it from proving useful in the subset of patients undergoing LVRS. The BODE index was designed to assess chronic obstructive pulmonary disease across the spectrum from mild to severe disease. Unfortunately, patients undergoing LVRS do not span this spectrum; all operative candidates have extremely advanced emphysema and fall toward the severe end. The article of Lederer and colleagues¹ exemplifies this finding in that more than 90% of their patients were at the extreme in all four dimensions of the index (percentage of predicted forced expiratory volume in 1 second, 6-minute walk, modified Medical Research Council dyspnea score, and body mass index). With all patients clustered together at one end of the spectrum, the BODE is inherently limited in its ability to discriminate between patients likely to respond and those likely to have extreme morbidity and mortality.

The study also illustrates both the good and the bad effects that have emanated from the National Emphysema Treatment Trial (NETT). The good is exemplified in the remarkably low morbidity evidenced in the patient population reported in the article. The NETT clearly and definitively identified the optimal candidate profile and thus allowed the selection of patients with the lowest risk-benefit ratio. The superb results of the patients who were chosen according to the final NETT recommendations are a testament to the value of this multi-institutional randomized trial.

The trial, however, has also had a chilling and detrimental effect on the referral of patients with end-stage emphysema for consideration of LVRS. The first article outlining results from the NETT trial documented poor results in a subset at very high risk, and thereafter referrals to the trial markedly declined.² Many NETT investigators believe that this occurred because the public and the medical community misinterpreted the conclusions as suggesting that LVRS was too risky to undertake for any patient. Others believe that the relative inaccessibility of LVRS (only 17 NETT sites throughout the country throughout the 7-year duration of the trial) served to dampen the interest of internists and pulmonologists who would have otherwise referred patients for this potentially lifesaving intervention. In effect, both patients with end-stage emphysema and their caregivers either forgot about or lost interest in LVRS during this prolonged period. Whatever the reasons, it is noteworthy that in 2004 (the most recent year for which figures are available) only 254 patients in the entire country underwent LVRS (*Current Procedural Terminology* code 32491) paid for under Medicare (data obtained from Centers for Medicare &

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Medicaid Services 2004 database). This occurred even though 42 centers have been approved to perform LVRS since 2002. The number of patients with end-stage emphysema likely exceeds 100,000, so this remarkably small number of surgical interventions suggests severe underuse of what is for many a potentially lifesaving procedure that also significantly improves both exercise capacity and quality of life.

Although I do not believe that the BODE index is likely to provide the surrogate data points necessary to reliably predict long-term survival, I congratulate the authors on their excellent results and their continued work in the field of LVRS. It is important for all participants in LVRS programs to continue investigating and promoting LVRS in

the hope of reminding both patients and their physicians of the remarkable improvement that can be achieved. Until referrals for LVRS vastly increase, this remains an unrealized improvement.

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