Continuous Positive Airway Pressure in Patients With Congestive Heart Failure and Cheyne-Stokes Respiration With Central Sleep Apnea

To the Editor:

The article by Sin et al on the effect of continuous positive airway pressure (CPAP) in patients with congestive heart failure (CHF) who have Cheyne-Stokes respiration with central sleep apnea (CSR-CSA) is one more step toward further defining the role of treatment for sleep-disordered breathing in CHF. The authors conclude that CPAP improves short-term left ventricular ejection fraction (LVEF) 3 months into the trial, we could not evaluate whether improvements in LVEF were sustained beyond this period. However, we are presently conducting a long-term, multicenter, randomized trial of continuous positive airway pressure (CPAP) in patients with congestive heart failure (CHF) and Cheyne-Stokes respiration with central sleep apnea (CSR-CSA), the Canadian Positive Airway Pressure for Heart Failure (CANPAP) trial, with cardiac transplant-free survival as the primary outcome. Serial measurements of LVEF will be made throughout the 5-year duration of the trial. This will allow us to determine whether early improvements in LVEF are sustained and related to the primary outcome.

Although we did not measure the effects of CPAP on the severity of CSR-CSA in our latest trial, we have done so previously. Naughton et al demonstrated a 65% reduction in the frequency of central apneas and hypopneas (from 43 to 15 per hour) after 1 month of outpatient CPAP. CPAP is generally not effective in alleviating CSR-CSA during a single night; it requires several days to weeks for this beneficial effect to accrue.

A total of 83% of the patients with CSR-CSA had ischemic cardiomyopathy. Therefore, we agree that CPAP-induced reductions in preload and afterload, the elimination of apnea-related hypoxia, and decreases in sympathetic nervous system activity could have reduced episodes of nocturnal ischemia in such patients. However, this does not preclude a beneficial effect of CPAP in patients with nonischemic dilated cardiomyopathy.

Although the number of patients in our trial was too small for subgroup analysis, among patients with CSR-CSA, the beneficial effects of CPAP on LVEF were similar in those with ischemic and nonischemic cardiomyopathy. Moreover, in our analysis of transplant-free survival, we controlled for underlying cause of CHF. Therefore, the more pronounced beneficial effect of CPAP on LVEF and transplant-free survival in the CSR-CSA group than in the non-CSR-CSA group is not likely to be accounted for by the higher proportion of patients with ischemic cardiomyopathy in the former group.

Although not evaluated in the present study, we demonstrated in a previous trial that hospital admissions were greatly reduced and quality-of-life and subjective exercise capacity improved in the CPAP-treated group. With respect to CPAP compliance, please note that patients randomized to CPAP used it 6 hours per day during the first 3 months of the trial. We agree, however, that it would be important to assess hospital admissions, quality-of-life, and CPAP compliance over longer periods because CPAP may be lifelong therapy. Indeed, these factors will be assessed over the entire 5-year duration of the CANPAP trial.

Response

Mehta and Groth raise several important points about our study. Because there was only a single reassessment of left ventricular ejection fraction (LVEF) 3 months into the trial, we could not evaluate whether improvements in LVEF were sustained beyond this period. However, we are presently conducting a long-term, multicenter, randomized trial of continuous positive airway pressure (CPAP) in patients with congestive heart failure (CHF) and Cheyne-Stokes respiration with central sleep apnea (CSR-CSA), the Canadian Positive Airway Pressure for Heart Failure (CANPAP) trial, with cardiac transplant-free survival as the primary outcome. Serial measurements of LVEF will be made throughout the 5-year duration of the trial. This will allow us to determine whether early improvements in LVEF are sustained and related to the primary outcome.

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