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Benefits of Incentive Spirometry:

Still More Work to Do

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We read with interest the randomized clinical trial on incentive spirometry (IS) in patients undergoing coronary artery bypass grafting (CABG) by Eltorai and colleagues.[1] The authors demonstrated that adding an hourly audible reminder for IS increases compliance. This is an interesting use of a device developed by the authors and does seem to improve compliance with a therapy that many believe decreases respiratory complications and promotes rehabilitation and discharge following any operation. However, the remainder of the study does require caution when interpreting the claimed improvement in outcomes.

For the clinical end point in the study (on which the initial power calculations were based), the authors use the modified Wilcox score for lung atelectasis.[2] Unfortunately, this is not routinely used in clinical evaluation and treatment of patients undergoing CABG. Furthermore, although there was a reported significant difference between the initial postoperative radiography results and the predischarge radiography results, the absolute difference may not necessarily reflect clinical significance. Using a somewhat obscure risk score as the basis for power calculation directly affects the next issues with this study: the differences in the control and intervention groups. After a review of the raw data presented in the tables and supplementary material, it is evident that the bell on and bell off groups may have clinically significant differences in their risk profiles that did not meet statistical significance because of the relatively small sample size. The authors chose not to report the well-validated Society of Thoracic Surgeons risk scores associated with isolated or concomitant CABG.[3] This would have provided insights into the true equipoise of the 2 groups. A variable that deserves attention was the significantly increased history of smoking in the control arm, which as a single factor may predict a more difficult postoperative respiratory recovery.

The reported differences in length of stay (LOS) and intensive care unit LOS can be particularly affected by these unrealized population differences. For example, the duration of mechanical ventilation and chest tube days were increased in the control groups.[1] These 2 factors will increase intensive care unit and overall LOS by several hours, which can easily role into the 1-day difference in each cited by Eltorai et al.[1] There was also no difference in

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pulmonary complications or function between the 2 groups. This leads to the possibility that the IS intervention is not the only thing that was dictating the outcomes differences.

The authors are to be congratulated for developing a device for easily measuring and increasing adherence to IS performance. However, we believe that larger clinical trials that are powered to detect important clinically significant end points between well-balanced groups will be required to determine if the cost and use of such a device is justified.

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