“It’s not easy being wheezy”

Zubair Luqman, MD, FRCSC, and Rakesh C. Arora, MD, PhD, FRCSC

From the Department of Surgery, University of Manitoba, Winnipeg, Manitoba, Canada; and Cardiac Sciences Program, St Boniface Hospital, Winnipeg, Manitoba, Canada.

Disclosures: R.C.A. has an unrestricted educational grant from Pfizer Canada Inc, and has received honoraria from Mallinckrodt Pharmaceutical. Z.L. has nothing to disclose with regard to commercial support.

Received for publication May 27, 2018; revisions received May 27, 2018; accepted for publication May 30, 2018; available ahead of print July 17, 2018.

Address for reprints: Rakesh C. Arora, MD, PhD, FRCSC, St Boniface Hospital Winnipeg, CR3015 – 369 Tache Ave, Winnipeg, Manitoba R2H 2A6, Canada (E-mail: rakeshearora@gmail.com).

J Thorac Cardiovasc Surg 2018;156:1552-3

0022-5223/\$36.00

Copyright © 2018 by The American Association for Thoracic Surgery

<https://doi.org/10.1016/j.jtcvs.2018.05.115>

Zubair Luqman, MD, and Rakesh C. Arora, MD, PhD, FRCSC

Central Message

Using clinically feasible tools to determine the severity of COPD may provide the perioperative team a target for preoperative optimization.

See Article page 1554.

Vulnerable patients with multiple comorbidities, especially chronic obstructive pulmonary disease (COPD), are increasingly undergoing cardiac surgery in the current era.¹ COPD affects more than 5% of the population² and is associated with worse morbidity and mortality after coronary artery bypass grafting. It has been postulated that off-pump coronary artery bypass grafting (OPCAB) might offer some advantage in terms of better postoperative pulmonary function.³⁻⁵ However, 2 large randomized clinical trials studies that compared OPCAB and on-pump coronary artery bypass grafting (ROOBY⁶ and CORONARY⁷ trials) did not show any significant clinical difference in postoperative pulmonary function. The severity of COPD and correlative pulmonary function test parameters were not extensively examined in these analyses.

Viceconte and colleagues⁸ have sought to address this gap in knowledge with the use of the Global Initiative for Obstructive Lung Disease criteria⁹ to determine the impact of COPD severity with length of postoperative mechanical ventilation, postoperative hospital stay, and incidence of pneumonia. In this prospective study of 251 patients, the authors have identified that the greater impairment in pulmonary function (particularly in those with a forced expiratory volume in the first second of <50%) was associated with worse clinical outcomes in patients undergoing OPCAB. They used an assessment tool that could be feasibly implemented in clinical practice. Although the Body-mass index, airflow Obstruction, Dyspnea, and Exercise index,⁹ which uses multiple patient factors, may provide better prognostic value in terms of pulmonary rehabilitation and intervention,¹⁰ the authors have chosen the Global Initiative for Obstructive Lung Disease criteria, presumably, because of its bedside availability (with spirometry).

There are certain elements of this study that are important to consider for future investigations. The authors have chosen to include patients with no COPD in the group of patients with mild COPD severity. It would likely have been of benefit to keep these groups of patients separate because it is not clear that these patients are the “same.”

Furthermore, previous investigations have demonstrated a poor correlation among forced expiratory volume in 1 second, symptoms, and impairment of a patient’s functional status.^{11,12} A formal symptomatic assessment also is typically required. As the authors have stated, the clinicians were not blinded to the results of spirometry. In the absence of stated criteria for extubation, pain control, and early mobilization, one has to interpret data mechanical ventilation time and postoperative length of stay with some caution. Next, it would be interesting to know the effect of pleurotomy on postoperative pulmonary function. Dennie and colleagues¹³ have reported that skeletonization of internal thoracic arteries, with preservation of pleural integrity, is associated with lesser incidence of postoperative pleural effusion, which may affect postoperative pulmonary function. Last, it would have been of benefit for the authors to provide information hospital readmission rates and other longer-term patient-reported outcomes to provide insight to risk factors that prevent successful recovery after hospital discharge.

Although the study by Viceconte and colleagues⁸ not does demonstrate any protective effect of OPCAB in patients with moderate or severe COPD, it highlights the importance of undertaking detailed assessments in vulnerable patient populations undergoing cardiac surgery, such as those with COPD. They have provided important information on COPD severity and outcomes using a clinical useful tool that potentially can be implemented by the perioperative team.¹⁴ This provides a potential target for perioperative

enhanced recovery protocol development¹⁵; however, future study is required to understand if the use of preoperative optimization and rehabilitation improves postoperative outcomes in this vulnerable patient population.

References

1. Boschetto P, Beghe B, Fabbri LM, Ceconi C. Link between chronic obstructive pulmonary disease and coronary artery disease: implication for clinical practice. *Respirology*. 2012;17:422-31.
2. Centers for Disease Control and Prevention. Chronic obstructive pulmonary disease among adults—United States, 2011. *MMWR Morb Mortal Wkly Rep*. 2012; 61:938-43.
3. Mack MJ, Pfister A, Bachand D, Emery R, Magee MJ, Connolly M, et al. Comparison of coronary bypass surgery with and without cardiopulmonary bypass in patients with multivessel disease. *J Thorac Cardiovasc Surg*. 2004;127:167-73.
4. Kara I, Cakalagaoglu C, Ay Y, Al Salehi S, Yanartas M, Anasiz H, et al. Reoperative coronary artery bypass surgery: the role of on-pump and off-pump techniques on factors affecting hospital mortality and morbidity. *Ann Thorac Cardiovasc Surg*. 2013;19:435-40.
5. Chiarenza F, Tsoutsouras T, Cassisi C, Santonocito C, Gerry S, Astuto M, et al. The effects of on-pump and off-pump coronary artery bypass surgery on respiratory function in the early postoperative period. *J Intensive Care Med*. 2017; 885066617696852.
6. Shroyer AL, Grover FL, Hattler B, Collins JF, McDonald GO, Kozora E, et al. On-pump versus off-pump coronary-artery bypass surgery. *N Engl J Med*. 2009;361:1827-37.
7. Lamy A, Devereaux PJ, Prabhakaran D, Taggart DP, Hu S, Straka Z, et al. Five-year outcomes after off-pump or on-pump coronary-artery bypass grafting. *N Engl J Med*. 2016;375:2359-68.
8. Viceconte M, Rocco IS, Pauletti HO, Vidotto M, Arena R, Gomes WJ, et al. Chronic obstructive pulmonary disease severity influences outcomes after off-pump coronary artery bypass. *J Thorac Cardiovasc Surg*. 2018;156: 1554-61.
9. Vogelmeier CF, Criner GJ, Martinez FJ, Anzueto A, Barnes PJ, Bourbeau J, et al. Global strategy for the diagnosis, management and prevention of chronic obstructive lung disease 2017 report: GOLD executive summary. *Respirology*. 2017;22:575-601.
10. Celli BR, Cote CG, Marin JM, Casanova C, Montes de Oca M, Mendez RA, et al. The body-mass index, airflow obstruction, dyspnea, and exercise capacity index in chronic obstructive pulmonary disease. *N Engl J Med*. 2004;350:1005-12.
11. Jones PW. Health status and the spiral of decline. *COPD*. 2009;6:59-63.
12. Han MK, Muellerova H, Curran-Everett D, Dransfield MT, Washko GR, Regan EA, et al. GOLD 2011 disease severity classification in COPDGene: a prospective cohort study. *Lancet Respir Med*. 2013;1:43-50.
13. Dennie CJ, Oikonomou A, Thornhill R, Rubens FD. Assessment of the impact of skeletonization on pleuropulmonary changes after bilateral internal thoracic artery harvest for coronary artery bypass grafting. *Scand J Surg*. 2016;105:168-73.
14. Rabe KF, Hurd S, Anzueto A, Barnes PJ, Buist SA, Calverley P, et al. Global strategy for the diagnosis, management, and prevention of chronic obstructive pulmonary disease: GOLD executive summary. *Am J Respir Crit Care Med*. 2007;176:532-55.
15. Ljungqvist O, Scott M, Fearon KC. Enhanced recovery after surgery: a review. *JAMA Surg*. 2017;152:292-8.