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Reply to the Editor:

We do agree with Cesario and colleagues that pulmonary rehabilitation (PR) could improve clinical conditions in patients with chronic obstructive pulmonary disease (COPD), as well as in patients operated on for lung cancer, although PR in patients with COPD takes into account different strategies compared with rehabilitation in surgical patients. Indeed, PR in patients with COPD, particularly long-term physical training programs, can ameliorate dyspnea, exercise capacity, and quality of life but not pulmonary volumes and gas exchange.¹ On the other hand, preoperative and postoperative PR, including chest physiotherapy, deep-breathing exercises, continuous positive airways pressure, incentive spirometry and so on, can reduce respiratory complications and hospital stay² by reducing bronchial sputum impaction and bronchial secretions and by alveolar recruitment. This approach is commonly adopted in most thoracic units and usually in general operations for high-risk patients.

In our study we evaluated patients submitted to lobar or limited lung resection, taking into account the late postoperative pulmonary recovery; for this reason, we have not considered the early functional outcome and postoperative pulmonary complications. The pulmonary function tests and blood gas analysis were performed after hospital discharge (usually be-

tween the 3rd and 15th month), and therefore in our study preoperative and postoperative PR has not been considered because of its limited role in this context. In our hospital we perform a short course of preoperative and postoperative PR (chest physiotherapy, incentive spirometry, huffing, coughing, and, when necessary, continuous positive airways pressure) in patients submitted to lung resection, and this contributes to reduce postoperative pulmonary complications, but I do not have experience on the effect on gas exchange and on hemodynamic and pulmonary function, although I suspect that this would occur mainly in patients with excessive bronchial secretion and postoperative atelectasis. Reports^{2,3} emphasize the importance of intensive PR (at least a 2- to 4-week course) in patients undergoing lung cancer surgery, and I think that in patients with moderate-to-severe COPD, this strategy can improve the outcome of lung resection, especially considering that these patients seem to deteriorate less compared with normal patients.⁴⁻⁸

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Dor fundoplication after myotomy for achalasia: Useful, unnecessary, or harmful?

To the Editor:

We appreciated the interesting and accurate article from Rice and colleagues¹ that was recently published in the *Journal*. In this report, the authors emphasized the fact that addition of a Dor-type fundoplication procedure to a Heller myotomy increases both resting and residual lower esophageal sphincter (LES) pressure, reducing the adequacy of myotomy itself. Our group has established experience with this issue. We reported that the basal LES pressure, measured by intraoperative manometry, was always close to 0 mm Hg after myotomy and increased after Dor fundoplication.² On the basis of our own previous observations, we presume that pressure values recorded in patients undergoing myotomy alone remain somewhat high because of an underlying incomplete incision of muscular fibers as the result of technical difficulties (62% of patients in the study by Rice and colleagues¹ had prior nonsurgical treatments). Furthermore, in the report,¹ the addition of a Dor fundoplication increased both resting and residual LES pressure but did not impair esophageal emptying. In our experience, higher pressures recorded in the Heller-Dor group could be easily related to a newly established "high pressure zone" rather than to an inadequate myotomy.

According to this evidence and that outlined in the prospective, randomized, double-blind clinical trial by Richards and colleagues,³ we advise the use of a partial anterior fundoplication after myotomy for several reasons. First, because the Dor-type procedure does not cause a significant postoperative dysphagia, and second, and most important, as also demonstrated by Costantini and colleagues,⁴

because the associated procedure (Heller myotomy plus Dor fundoplication) proved to be superior to the Heller procedure alone when the incidence of postoperative gastroesophageal reflux at short- and long-term follow-up is considered. We believe that suturing the gastric wall to the edges of the myotomy with 3 stitches on each side, according to the Dor technique, maintains the edges of the myotomy open, thus preventing consequences of scar tissue repair, and covers any undetected perforation of the esophageal mucosal layer, thus preventing significant perioperative morbidity. According to our experience,⁵ we advise the use of radionuclide esophageal transit study in evaluating the esophageal transit time and esophageal emptying after myotomy because it is more accurate than the analysis of changes in timed barium esophagograms as suggested by Rice and colleagues.¹ We appreciate the authors' feedback on the observations raised.

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Reply to the Editor:

We thank Porziella and colleagues for their comments and suggestions. In our study, esophageal manometry was performed preoperatively and postoperatively, but not intraoperatively. Therefore, we cannot compare published intraoperative results with our results. As Dr Cesario pointed out, at least for fundoplication, there is poor correlation between intraoperative and postoperative manometry.

In our patients who underwent Heller myotomy alone, median resting pressure was 13.3 mm Hg, and median residual pressure was 1.8 mm Hg. Incomplete myotomy or rapid early healing of the nondistracted lower portion of the myotomy may account for the few elevated measurements. No doubt prior therapy can obliterate the plane between the muscularis propria and submucosa, making myotomy more difficult and perhaps incomplete. However, in patients who underwent

Heller myotomy and Dor fundoplication, median resting pressure was 17.5 mm Hg ($P = .02$ compared with Heller myotomy alone), and resting pressure was 4.6 mm Hg ($P = .002$). Despite the identical myotomy technique, there were higher median lower esophageal sphincter resting and residual pressures, no doubt the result of Dor fundoplication. Despite this, esophageal emptying was not impaired. Therefore, Dor fundoplication can be added to Heller myotomy without adverse effects on esophageal emptying, the principal objective of therapy.

There are several theoretic reasons to add Dor fundoplication to Heller myotomy in treating achalasia: (1) Dor fundoplication provides a serosal patch over the myotomy, perhaps reducing postoperative leaks; (2) stitching the edges of a Dor fundoplication to the edges of a myotomy "holds" the myotomy open; and (3) Dor fundoplication provides a buttress to the myotomized esophagus and prevents formation of a pseudodiverticulum. However, the only proven effect of Dor fundoplication on Heller myotomy is reduction of gastroesophageal reflux. This is crucial in patients with myotomized achalasia who have no esophageal peristalsis to clear refluxed acid and bile.

We have abandoned nuclear medicine studies of esophageal emptying because they are costly and inconvenient, and lack anatomic definition. Timed barium esophagram is simple, fast, inexpensive, repeatable, and comfortable, and is an anatomic examination. We use it preoperatively, 8 weeks postoperatively, and in yearly follow-up in all our patients with achalasia.

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