Prolonged air leak after pulmonary lobectomy

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Provenance: This is an invited article commissioned by the Academic Editor Dr. Shuangjiang Li (Department of Thoracic Surgery and West China Medical Center, West China Hospital, Sichuan University, Chengdu, China).


Submitted May 31, 2019. Accepted for publication Jul 16, 2019.
doi: 10.21037/jtd.2019.07.49

View this article at: http://dx.doi.org/10.21037/jtd.2019.07.49

Prolonged air leak after pulmonary resection is defined as air leak from the residual pulmonary parenchyma until the fourth, fifth or seventh day after surgery, according to different classifications (1). It represents one of the most frequent adverse events after lung resection (2), affecting up to 25% of patients undergoing pulmonary resections (3). Prolonged air leak is frequently associated with several postoperative complications—ranging from simple pulmonary atelectasis to severe pneumonia and pleural empyema—thus causing prolonged hospital stay and higher hospital costs (4).

It has been reported that—although specific techniques, intraoperative strategies and dedicated devices are commonly used to prevent prolonged air leaks—at least 5% of patients still present air coming out from the residual lung at discharge (5).

Many data suggest that prolonged air leak is less frequent after left lower lobectomy: this is probably due to the presence of a single fissure to dissect (versus two fissures on the opposite side); moreover the higher mobility of the left diaphragm allows a faster space obliteration as well as the shifting of the mediastinum to the left (6).

Prolonged air leak occurring after standard pulmonary lobectomy may significantly affect postoperative course, total length of stay and may cause psychological disabling effects on many patients, thus culminating in potential unexpected post-operative complications that can be otherwise observed after very extended procedures (7,8).

We have previously demonstrated that quantification of emphysema by computed tomography is an useful predictor of postoperative prolonged air leak after pulmonary resection for lung neoplasms; moreover we were able to preoperatively identify risk factors for postoperative prolonged air leak, thereby allowing a correct risk assessment before resection (1). In daily clinical practice, these findings may suggest a dedicated intraoperative surgical and anesthesiological management, in particular of fissure dissection that may benefit of additional sealing procedures for more accurate aerostasis; moreover, a protective ventilation technique is recommended in high risk patients to minimize parenchymal barotrauma. A dedicate post-resectional physiotherapy strategy—based on volume incentivation, avoiding forced expiratory exercise and provoked cough—may further prevent additional risk of persistent air leak (9).

In their paper, Murakami et al. assess the efficacy of quantitative computed tomography-based quantification of emphysema to predict air leak after video assisted lobectomy (10). The Authors report that the emphysema index—representing the grade of emphysema by the proportion of the emphysematous lung volume to the total lung volume by a computed tomography evaluation—is the ideal predictor of prolonged air leak according the ROC curve analysis and the only significant predictor—in both univariate and multivariate analyses—for postoperative chest drainage length (10).

Interestingly, the author report their peculiar chest drain strategy, consisting in a 20 F chest tube placement
under uninterrupted aspiration at—5 cmH₂O, before the chest wall closure, and its removal in the operating theatre, in case of no air leaks were observed after extubation; on the contrary, in case of air leak, drainages were removed the day after air leaks stopped, regardless the quantity of fluid drainage. Another interesting aspect worth of deep analysis is that chest drainages were not positioned after the operation in 36% of patients and no related complications were reported (10).

This peculiar approach may offer several benefits to operated patients, in particular may significantly reduce apical chest pain often experienced by patients and due to the tip of the tube stimulating parietal apical pleura, in particular in case of well expanded lung; not infrequently, in facts, patients complaints are mainly related to chest tube drainage rather than surgical incisions and—quite surprisingly—not only in case of VATS approach but also after standard total muscle sparing lateral thoracotomy, we have widely used in the past recent years in many different clinical scenarios (11-14). In this way, postoperative chest tube management can significantly impact on postoperative length of stay and immediate quality of life, thus contributing to enhanced recovery after surgery (ERAS) “philosophy”, as well as minimally invasive surgical approach itself (15,16).

**Acknowledgments**

None.

**Footnote**

*Conflicts of Interest:* The authors have no conflicts of interest to declare.

*Ethical Statement:* The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

**References**

