



Open left pneumonectomy: ancillary considerations

Pascal A. Thomas

Department of Thoracic Surgery, Aix-Marseille University, North Hospital, Marseille, France

Correspondence to: Pascal A. Thomas. Service de Chirurgie Thoracique, Maladies de l'Oesophage et Transplantations Pulmonaires, Hôpital Nord, chemin des Bourrely, 13915 Marseille cedex 20, France. Email: pathomas@ap-hm.fr.

Comment on: Kostoulas N, Papagiannopoulos K. Open surgical approach and technique in left pneumonectomy. *Shanghai Chest* 2017;1:23.

Received: 02 November 2017; Accepted: 14 November 2017; Published: 01 December 2017.

doi: 10.21037/shc.2017.11.05

View this article at: <http://dx.doi.org/10.21037/shc.2017.11.05>

Pneumonectomy becomes an infrequently surgical procedure, representing now less than 10% of all types of major pulmonary resections performed to cure lung cancer (1). The performance of a pneumonectomy for lung cancer remains a high-risk surgical procedure despite optimization of surgical technique and postoperative care. Therefore, general thoracic surgeons try to avoid pneumonectomy whenever possible because of the reported poor quality of life, increased morbidity and mortality, and the thought that a pneumonectomy is, in itself, a disease (2). However, sometimes a pneumonectomy is the only way to achieve a R0 resection, typically for centrally located tumors. Actually, left pneumonectomy is a more easily accepted and performed procedure because its associated perioperative mortality is half lower than that of a right pneumonectomy (1,3). Theoretic rationales supporting these clues are a smaller parenchymal volume removed and a bronchial stump less exposed to the pleural space, thereby lessening the incidence of post-pneumonectomy respiratory failure and bronchial leaks, respectively. As a result, complex bronchoplastic and angioplastic lung sparing resections are less likely to be used on the left side (4). Indeed, current mortality and morbidity figures of left pneumonectomy are very similar to those of complex extended lobectomies (1,4). Therefore, left pneumonectomy should remain a valuable tool in every thoracic surgeon's armamentarium.

Kostoulas and Papagiannopoulos (5) gave an excellent description of the open technique in left pneumonectomy. Some technical aspects deserve to be challenged: the surgical approach, the safe control of the pulmonary hilum, and the prevention of left laryngeal nerve injuries.

Despite some reported advantages on the early postoperative course, widespread adoption of a video-assisted

thoroscopic surgery (VATS) approach to pneumonectomy progressed at a relatively slow pace. Indeed, experiences for thoroscopic pneumonectomy are limited since the first report by Walker in 1994 (6). Thus, as emphasized by Kostoulas and Papagiannopoulos, the classic thoracotomy remains an important approach to the thoracic surgeon. The authors recommend the posterolateral thoracotomy, the historic gold standard for thoracic incisions, which provides an excellent exposure of the lung, hilum, and mediastinum. Alternatively, the use of the lateral muscle-sparing thoracotomy produces less postoperative pain, facilitates shoulder motility, and moreover preserves the major chest wall muscles that are very helpful to manage some life-threatening complications of pneumonectomy such as empyema and bronchopleural fistula (7). This approach offers an excellent exposure of the operative field, allowing the performance of all kinds of complex resections, with only one limitation: the invasion of the posterior chest wall.

Obtaining control of the main pulmonary artery is the most critical step of the operation. The manoeuvre is greatly facilitated by the intrapericardial dissection of the hilum, which may be used liberally in my opinion, and will sometimes help at identifying a unilateral single left pulmonary vein, a frequent congenital variation of the pulmonary venous anatomy. Stapling and dividing the left upper pulmonary vein first facilitate the exposure of the left pulmonary artery trunk. When the coverage of the bronchial stump is planned; i.e., following induction therapies, the wide opening of the pericardial sac behind the phrenic nerve helps at appreciating the potential use of a pericardial flap. In that case, care is taken to preserve the phrenic nerve whenever possible, because phrenic nerve

dysfunction after pneumonectomy might have an impact on the functional behavior of the contralateral diaphragm. Then, the pericardial defect is repaired using a mesh in order to prevent cardiac herniation.

Because of obvious anatomic considerations, the left recurrent laryngeal nerve is particularly exposed to cancer invasion and to surgical injury, especially at the occasion of the dissection of the lymph nodes located at the aortopulmonary window. Impaired laryngeal mobility can be dramatic after left pneumonectomy because of repeated inhalations in a single remaining right lung causing infection and respiratory distress. Thus, a great attention should be taken to expose this area. Once the phrenic and the vagus nerves have been formally identified, the mediastinal pleura facing the aortopulmonary window is incised, and the origin of the recurrent laryngeal nerve is identified. This may be difficult in a fatty mediastinum. In that occurrence, splitting the ligamentum arteriosum can be very helpful. Indeed, the left laryngeal nerve takes off from the left vagus nerve on the lateral aspect of the aortic arch, wrapping posteriorly underneath the ligamentum arteriosum and ascending cephalad in the tracheoesophageal groove. Splitting the ligamentum arteriosum may also give access to the right paratracheal lymph node station, if necessary.

In the era of lung sparing resections and minimally invasive approaches, open pneumonectomy is still necessary for several pulmonary or pleural malignant or benign diseases. In contrast with right-sided pneumonectomy, left pneumonectomy carries early surgical risks not that far from those associated with lobectomy/bilobectomy. Nevertheless, it is widely accepted that extended lobectomies associated with bronchoplastic and angioplastic procedures should be attempted and preferred over pneumonectomy on that side also in order to preserve quality of life, provided that a complete oncological resection is achieved. In the current state of “real life” practices, thoracotomy is still needed to perform such complex procedures. In other words, an open extended left lobectomy is preferable to a VATS left pneumonectomy whenever possible. The article from Kostoulas and Papagiannopoulos is a timely reminder of the conventional technique, not only for the youngest thoracic surgeons.

Acknowledgments

Funding: None.

Footnote

Provenance and Peer Review: This article was commissioned and reviewed by Dr. Jianfei Shen, MD (Department of Cardiothoracic Surgery, Taizhou Hospital of Zhejiang Province, Wenzhou Medical University, Taizhou, China).

Conflicts of Interest: The author has completed the ICMJE uniform disclosure form (available at <http://dx.doi.org/10.21037/shc.2017.11.05>). The author has no conflicts of interest to declare.

Ethical Statement: The author is 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.

Open Access Statement: This is an Open Access article distributed in accordance with the Creative Commons Attribution-NonCommercial-NoDerivs 4.0 International License (CC BY-NC-ND 4.0), which permits the non-commercial replication and distribution of the article with the strict proviso that no changes or edits are made and the original work is properly cited (including links to both the formal publication through the relevant DOI and the license). See: <https://creativecommons.org/licenses/by-nc-nd/4.0/>.

References

1. Thomas PA, Berbis J, Baste JM, et al. Pneumonectomy for lung cancer: contemporary national early morbidity and mortality outcomes. *J Thorac Cardiovasc Surg* 2015;149:73-82.
2. Bryant AS, Cerfolio RJ, Minnich DJ. Survival and quality of life at least 1 year after pneumonectomy. *J Thorac Cardiovasc Surg* 2012;144:1139-43.
3. Fernandez FG, Force SD, Pickens A. Impact of laterality on early and late survival after pneumonectomy. *Ann Thorac Surg* 2011;92:244-9.
4. Pagès PB, Mordant P, Renaud S, et al. Sleeve lobectomy may provide better outcomes than pneumonectomy for non-small cell lung cancer. A decade in a nationwide study. *J Thorac Cardiovasc Surg* 2017;153:184-95.e3.
5. Kostoulas N, Papagiannopoulos K. Open surgical approach and technique in left pneumonectomy. *Shanghai Chest* 2017;1:23.

6. Walker WS, Carnochan FM, Mattar S. Video-assisted thoracoscopic pneumonectomy. *Br J Surg* 1994;81:81-2.
7. Hazelrigg SR, Landreneau RJ, Boley TM, et al. The effect of muscle-sparing versus standard posterolateral

thoracotomy on pulmonary function, muscle strength, and postoperative pain. *J Thorac Cardiovasc Surg* 1991;101:394-400; discussion 400-1.

doi: 10.21037/shc.2017.11.05

Cite this article as: Pascal A. Thomas. Open left pneumonectomy: ancillary considerations. *Shanghai Chest* 2017;1:56.