



Editorial

Assessment of Pulmonary Function Prior to Lung Resection

Evaluación funcional previa a la resección pulmonar

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Since the SEPAR (Spanish Society of Pneumology and Thoracic Surgery) published its guidelines on surgical risk evaluation of lung cancer in 2005,¹ at least two clinical practice guides on the same subject have appeared in the field of medical publications, initiated by scientific communities.^{2,3} Without doubt, the preoperative functional assessment of the patient who will receive a lung resection continues to incite the interest of physicians, given that the most recent figures of mortality in lung resection in Europe are still 2% for lobectomy and 11% for pneumonectomy.⁴ It must be taken into account that according to the published survival rates, lung resection in lung cancer can be considered a curative treatment in the initial stages of the disease, but not in the advanced ones,⁵ as there are alternative therapies that could offer acceptable palliation with less risk involved than surgery.^{6,7} Therefore, it is just as important to avoid thoracotomy in high functional risk patients with tumours in which a lobectomy is improbable, as well as not excluding from the best treatment those high risk patients that can be potentially cured through lung resection. The most relevant and recently topical points to keep in mind in the subject of prior functional evaluation to a lung resection are the following:

1. *The decision-making process should be based on published practical clinical guidelines.* Without question, the decision to operate or not on a patient with lung cancer and limited lung function should be individual, multi-disciplinary and based on the best scientific evidence available. The practical clinical guidelines are a review process of the best scientific evidence published, carried out by experts on the subject. They facilitate discussion and decision-making, especially in critical or uncommon situations. In current medical practice, it is unacceptable that specialised surgical units should hold different criteria to those that exist in broad international consensus, especially if these criteria are not based on observational studies of the institution itself, that have been published after a paired revision process. There is no practical clinical guide included in Guiasalud (organism in charge of

fostering the use of practical clinical guides in the Spanish Healthcare System) referring to prior functional assessment to lung resection. However, until other reviews initiated in Spain are published or updated, as previously mentioned, two documents drafted on the subject by European² and American³ societies can be consulted. These documents can greatly facilitate the multi-disciplinary consensus in specific hospitals with thoracic surgery departments in which lung resections due to cancer are performed.

2. *The diffusing capacity of the lung for carbon monoxide should be measured in every patient, regardless of the volumes measured by forced spirometry.* Recent articles⁸ show that there is a feeble correlation between the preoperative values in the diffusing capacity of the lung for carbon monoxide (DLCO) and the forced spirometry volume in the first second, in percent of theoretical value (FEV₁%) and that the systematic calculation of the postoperative DLCO improves the prediction of lung resection risk. Moreover, a very recent publication⁹ states the finding of severe interstitial and diffuse histological alterations in 70% of the patients who received induction chemotherapy and were subsequently intervened. There is a certain amount of discrepancy when it comes to recommending the preoperative determining factor of the DLCO. While the American College of Chest Physicians³ guide recommends this only in cases with dyspnoea unexplained by the forced spirometry values or with radiological evidence of interstitial lung alteration, in the European Societies guide (European Respiratory Society and European Society of Thoracic Surgeons),² a preoperative measurement is recommended for every case. I personally consider this is the most correct option due to the fact that risk prediction of the resection is best if the preoperative value of the DLCO is available in every case.
3. *A standardised exercise stress test should be indicated for every patient with values under the normal in the diffusion or spirometry.* Discrepancies can also be found among the two most recently published accords. While in one of these³ the maximum oxygen consumption per minute calculation is only recommended when the postoperative FEV₁% or DLCO values are under 40% of the theoretical value for the patient. For the other,² an exercise stress test is recommended for all the patients with FEV₁% or DLCO

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below 80% of the theoretical value. The standardised exercise stress test allows for simultaneous and complete assessment of the cardiorespiratory system. The greatest obstacle for its generalisation in the study prior to the lung resection is the absence of appropriate technology in some of the centres in which major lung resections are performed. A valid alternative to the measurement of oxygen consumption is to perform more complex tests, such as the climbing steps test limited by the symptoms.² In this test, the cut off point that distinguishes patients who will not present complications is 22m. If the patient is unable to reach a height equivalent to 12m, a standardised exercise stress test with direct measurement of the maximum oxygen consumption per minute should be performed, given that in these cases there is a greater risk of surgical death.²

4. A lobectomy could improve the lung function in some patients with advanced chronic obstructive pulmonary disease (COPD) and lung cancer. Until recently, wedge resection was considered as a good therapeutic option in cases of patients with peripheral lung cancer and poor pulmonary function. However, it has been proven that the repercussion of the lobectomy in patients with COPD is lower than in those with normal pulmonary volumes and this difference exists from the first postoperative day.¹⁰ In addition to this, a recent publication¹¹ warns that segmentectomy does not offer any functional advantages versus lobectomy if the patient has an FEV₁ lower than 70% of the theoretical values. These data, although preliminary, serve as a base for subsequent studies on the functional utility of minor resections (anatomic or wedge segmentectomy) in patients with pulmonary emphysema.
5. Mortality results after 30 days from the service should be compared to the guideline values aimed at introducing the appropriate improvements in the case of unwanted rising deviations. Both in Spain¹² and in the rest of Europe,¹³ multi-institutional comparative experiences can be found of the results of mortality and morbidity of lung resection. These experiences offer the participants opportunities to improve the clinical practice and have a direct repercussion on patient health. The sharing of data from the unit with large data bases sponsored by scientific societies will allow to future construction of sturdy predictive models that facilitate decision making in patients with limited pulmonary function. An easily accessible European data base is currently available on the internet (<https://www.thoracicdata.org/content/index.php>), designed and audited by an ad hoc committee of the European Society of Thoracic Surgeons.

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